REORGANIZATION PLAN OF THE UNITED STATES BUREAU OF MINES

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HEARING

BEFORE THE

SUBCOMMITTEE ON MINES AND MINING

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS HOUSE OF REPRESENTATIVES

EIGHTY-THIRD CONGRESS

SECOND SESSION

ON

THE REORGANIZATION PLAN OF THE UNITED STATES BUREAU OF MINES

AUGUST 2, 1954

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CONTENTS

Statement of—	Page
Henry P. Caulfield, staff assistant to the Bureau of Mines survey team	61
John J. Forbes, Director, Bureau of Mines, Department of the Interior	57
John G. Liebert, Special Assistant to Assistant Secretary of the Interior, Felix Wormser	44, 62
Harry Perry, Acting Chief, Fuels and Explosives Division, Bureau of Mines, Department of the Interior	35
Ralph A. Tudor, Under Secretary of the Interior	1
Victor Wickersham, Member of Congress from the State of Oklahoma	62
Paul Zinner, Chief, Minerals Division, Bureau of Mines, Department of the Interior	43, 62

REORGANIZATION PLAN OF THE UNITED STATES BUREAU OF MINES

MONDAY, AUGUST 2, 1954

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MINES AND MINING OF THE
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D. C.

The subcommittee met at 10 a. m. in the committee room of the House Committee on Interior and Insular Affairs, Hon. J. Ernest Wharton (chairman of the subcommittee) presiding.

Mr. WHARTON. The Subcommittee on Mines and Mining will come to order for a hearing relative to the reorganization plan for the United States Bureau of Mines.

We have listed as our first witness the Under Secretary of Interior, Ralph A. Tudor.

STATEMENT OF RALPH A. TUDOR, UNDER SECRETARY OF INTERIOR, ACCOMPANIED BY JOHN J. FORBES, DIRECTOR, AND HARRY PERRY, ACTING CHIEF, FUELS AND EXPLOSIVES DIVISION OF THE BUREAU OF MINES

Mr. TUDOR. Mr. Chairman and gentlemen, I welcome the opportunity to discuss this survey report which was recently made on the Bureau of Mines, and its adoption by the Department of Interior, because I fear that there has been some misinterpretation of some of the recommendations made in it and the approvals by the Secretary.

I prepared a statement which I believe has been distributed to the members of the committee. I believe also the members of the committee have copies of the report which was made by the survey team to the Secretary, and the Secretary's letter of approval of that report.

Mr. WHARTON. Without objection, Secretary Tudor's statement and the survey report on the Bureau of Mines will be made a part of the record.

(The documents referred to are as follows:)

STATEMENT OF RALPH A. TUDOR, ACTING SECRETARY OF THE INTERIOR

I am very glad to be here this morning in response to Chairman Miller's invitation. I appreciate this opportunity not only because I want you to have a clear understanding of our position with regard to the recent survey of the Bureau of Mines, but also because this occasion enables me to inform this committee of one of the most important activities upon which the new adminstration in the Department of the Interior has been engaged during the past year and a half.

The survey of the Bureau of Mines is one of the number of surveys initiated by the Secretary in June 1953. To date, 16 surveys of activities of the Department

have been completed and approved by the Secretary. A few more are in process of completion and review prior to secretarial decision. We plan to continuously follow up the activities of the bureaus and services to determine progress made in carrying out the recommendations and what further changes in the conduct of their activities appear to be desirable.

The objective of the surveys has been to determine what is being done, if it is being done in an effective manner, and if there are ways of doing the job in a more efficient and economical manner within the programs and policies of the Congress and the new administration.

Outstanding men from professions, industry, universities, the press, and State and local governments, have largely composed the committees which have undertaken the surveys and are responsible for the report to the Secretary. We have indeed been fortunate in the response which men of broad executive, administrative, legal, scientific, and engineering experience, related to the work under review, have given in answer to our call for service to their Government. Qualified men now employed by the Federal Government have been members of the survey committees in a few instances. In order to assure an outside, fresh viewpoint, however, none of the Federal employees on the committees have been currently associated with the activity being surveyed.

The services rendered by those from outside the Government have often been at great personal sacrifice and inconvenience. In order to do the job properly (and all of these men have been very conscientious men), it has been necessary for them to spend a great many working days at the task and away from their normal pursuits, travel many thousands of miles, and talk to a great many officials and employees engaged in the activities being surveyed, as well as consult with businessmen, labor-union officials, trade-association officers, State and local government people, scientists, engineers, and others who have knowledge of, and an interest in, the activities being surveyed.

The 5-man survey team of the Bureau of Mines, for example, spent 72 working days together as a group. They traveled some 9,000 miles, and talked with approximately 150 officials and employees of the Bureau of Mines. They also secured the views of some 80 representatives of mineral and fuel companies, the United Mine Workers, trade associations, universities, and State governments and others. They spent long hours digesting what they heard and what they saw and in drafting their report on Bureau problems including recommendations. To aid them, they were provided staff assistants from the Office of the Secretary and stenographic and clerical services.

The recommendations contained in the completed reports of the survey teams must be reviewed and approved, of course, by the Secretary before the bureau concerned is directed to implement the recommendations in whole or in part. During this review, each survey team is usually asked to meet personally with Secretary McKay, as well as with me and the Assistant Secretary and other top officials and staff concerned. This gives us an opportunity to ask questions and secure the benefit of informal discussion of the problems. The director of the bureau also has an opportunity to review the report at this stage.

When the Secretary gives his approval of the recommendations in the report, with or without specific reservations, he recognizes, of course, that unforeseen difficulties and considerations may come to light which may call for modification of his approval. The heads of bureaus, therefore, are given the authority to make minor modifications themselves and to recommend major modifications to the Secretary's Office if any recommendation of the survey team is subsequently found to be unworkable. Some recommendations, which require particularly careful attention and, possibly, further consideration prior to implementation, are reserved for handling by the Assistant Secretary concerned.

I should also like to point out that, in order for some recommendations to be implemented, action by the Congress may be required. Nothing will be done in connection with such matters until congressional action is sought and Congress has acted. The recommendation of the survey team of the Bureau of Mines with respect to helium production is an obvious example of a recommendation which will require full and careful consideration and action by the Congress, before it could be implemented.

The press has given considerable prominence to the recommendations of the survey team of the Bureau of Mines with regard to helium, zirconium, and titanium production activities, and to synthetic fuels research and to Federal coal mine safety and inspection. Before clarifying the situation for you with regard to these particular recommendations, and indicating the qualifications which the survey team was careful to make concerning them, I would like to acquaint you very briefly with some of the team's other recommendations.

Four basic recommendations underlying the 39 detailed recommendations in the team's report were:

1. That the number of administrative regions be reduced from 9 to 4.
2. That the administration of health, safety, and coal mine inspection activities be separate and apart from scientific and technical research activities.
3. That there be a coordinated strengthening of all statistical and commodity analysis work.
4. That a plan of organization be adopted under which the Washington office retains responsibility for policy and program determination, while conduct and management of research are decentralized.

The survey team spent considerable time on the problem of the internal organization of the Bureau and its detailed recommendations which reflect a number of very important considerations:

First, in deciding upon and delineating the four regions the team gave particular attention to predominence of minerals and fuels in areas in relation to the location of existing Bureau of Mines' facilities and personnel and to the establishment of regions of sufficient size to justify the type of regional administrative organization which would make for maximum economy in administrative costs;

Second, the team's separation of health, safety, and coal mine inspection activities, from the regional organization recommended for the Bureau's other activities, recognized that "this type of activity is basically distinct and different from other Bureau functions";

Third, the organizational recommendations reflected a belief that the Bureau needs improved general management and it gave emphasis to this belief in its description of the duties of regional directors and the Chief of Regional Activities in Washington, and the Director.

Fourth, the organizational recommendations reflected a belief that unified direction strengthening of data collection, analysis, and policy appraisal for minerals and fuels is needed as well as more timely publication of statistical data and reduction of cost to a minimum for collection and processing of statistics.

Finally, the organizational recommendations reflected a belief that greater emphasis and explicit advice should be given to the Director on the scientific merit and technical feasibility, national security and economic importance, most efficient utilization of existing facilities and personnel, and cooperation with industry, by staff fully qualified to give such specialized advice, in the programing of proposed research projects. To assist the Director in considering this advice the organizational recommendations provide for an Asistant Director for Programs who will devote his full time to this task.

Recommendations aimed directly at improvement in efficiency and reduction of cost were:

"That research work on a particular ore or metal be confined insofar as possible to a single station to avoid unnecessary duplication.

"That the present program of disposal of excess property be vigorously pursued, with deadlines established for its accomplishment.

"That the inventory of automotive equipment be substantially reduced; that the Bureau establish use requirements for motor vehicles; and that the Bureau investigate the practicability of renting vehicles from commercial firms to meet peak requirements.

"That advisory committees be established and regularly consulted in connection with the functions of the Bureau, particularly in connection with mine health and safety matters with respect to minerals, solid fuels, and petroleum and natural gas research.

"That all other facilities and services, provided as facilitating services to research projects, be drastically reduced, and much greater reliance placed upon contracting for such services as needed."

"That the general policy of free distribution of the Bureau's output of publications be changed to a general policy of charging an appropriate price, with exceptions to this policy being permitted in carefully considered cases."

The survey team strongly endorsed the Bureau's strenuous efforts in recent years to develop an efficient system for initiation, review, and final authorization of research projects; to establish a new cost accounting system in cooperatin with the Office of the Secretary and the General Accounting Office; and to develop "a manual of instructions and authorized procedures for guidance of all

bureau personnel." The team made several technical recommendations looking toward the further development and refinement of these procedures.

The team was also concerned with the Bureau's recruitment and training of personnel and make two important recommendations in this regard. Further, it advised that "increased attention be given to cooperation with mineral and geologic departments of the individual States and that, where possible, the Bureau should "resume the type of cooperative research which it formerly conducted with universities and colleges."

Cooperation with industry and other Federal agencies in its research activities was also emphasized by the team. It expressed the belief that the use of outside funds to assist in support of Bureau research is sound and should be encouraged and extended as a concrete manifestation of cooperation.

Now, I would like to clarify for you the situation with regard to subjects covered in the survey team's report which were given prominence in the press.

One of the specific recommendations of the survey team which was approved by the Secretary was that "the Bureau should not engage in production activities, and should do everything possible to terminate present production activities." This is a sound premise for the proper field for the Bureau is basically research and development—not production.

Helium for good reasons may be somewhat of an exception to this premise and it should be clear that the Secretary by adopting the survey team's report has not as yet certainly recommended disposal of the Government's helium plants. The Bureau of Mines is the sole producer of helium. The survey team suggested that in the event any private business should desire to enter into helium production, the Government's helium plants should be sold or transferred on some mutually satisfactory contractual basis to private business interests and that the Bureau of Mines discontinue the production of helium. The survey team expressed a belief that private industry would be interested in the purchase of these facilities or in operating them if they were made available on some proper basis. We are disinclined to believe that private industry would be interested in assuming either ownership or operating responsibility with respect to the Government-owned helium plants.

However, if it develops that there is an interest, it would be essential to fully protect national security and conservation interests. Such arrangements would also have to receive congressional sanction in view of the legislative and appropriation history behind us.

In the meantime, the Secretary must meet his responsibility to satisfy essential defense and commercial demands for helium. In order to do this it will continue to be necessary for the Bureau to expand present facilities. The Department, therefore, continues its support of a supplemental appropriation that is before the Congress to this end. Morever, the Secretary has very recently changed the organizational arrangements within the Bureau of Mines for the management of our helium production responsibilities aimed at more effective and economical management and more complete divorcement of these activities from the research activities of the Bureau.

We in the Department are entirely in accord with the policy of removing Federal agencies from production-type activities which more appropriately should be carried on by others. At the same time, we see within the helium picture a number of factors, particularly with respect to national security, which call for careful and cautious consideration. Certainly any significant change in operational pattern would have to be thoroughly consistent with the public security and interest and in accord with the laws passed by Congress.

Production of titanium and zirconium by the Bureau of Mines was inaugurated at the request of Government agencies concerned with military security because original research done in the development of processes was carried on by the Bureau. It was decided that the Bureau was in the best position to undertake initial production to meet urgent security needs. As far as I know, no one ever contemplated that these production activities should continue beyond the time when industry was willing and able to take over production.

Production of titanium by private producers is scheduled to increase greatly next year and the Bureau of Mines is currently advised that this fact will enable its production at Boulder City, Nev., to cease in October 1954. The Bureau's production facilities at Boulder City are on such a small scale that it is very doubtful that industry would be interested in utilizing them for production of titanium. Our present production capacity is only equal to slightly over 1 percent of the total national capactiy expected to be functioning by the end of next year. The great bulk of the Nation's production is now coming from industry and at substantially less cost than our plant.

Bear in mind that our plant was a pilot affair set up to prove the technique developed by laboratory research. It did a magnificent job but was never intended to operate commercially. Production of zirconium and hafnium at the Bureau facilities at Albany, Oreg., continues to be essential in the interests of national security. No estimate can be made at this time as to when these facilities can stop production for such uses and be converted back to use in the normal research activities of the Bureau. It is to be expected that the production of these metals may follow along lines already experienced in the case of titanium. Now that the basic resarch and pilot-plant development has been successfully accomplished, normal commercial support will follow.

The survey team recommended that "research work on synthetic gaseous and liquid fuels from coal and lignite be confined to small-scale activitiy." Since the disposition of the demonstration plant at Louisiana, Mo., this work has been so confined. Present plans call for its continuance at Bruceton, Pa., and Morgantown, W. Va. The further recommendation of the survey team that this work not be "expanded and developed by the Bureau itself into large pilot and demonstration plants" is, in effect, a recommendation applying to any future proposals that may be made in this regard.

With respect to the facilities at Rifle, Colo., for the mining of oil shale and the production of oil from shale, the Bureau and the Assistant Secretary for Mineral Resources are now discussing with several private firms, either to have them take over the entire activity there on appropriate terms, or to develop a cooperative program between the private companies and the Bureau of Mines. No final decision has been made by the private companies as to what they would propose in this regard. In view of the very advanced state of research as regards production of oil from shale, with which I am sure you are all generally familiar, this change as recommended by the survey team, is entirely appropriate. In accordance with the long-established tradition of the Bureau it should step out, in whole or in part, whenever private industry is willing to shoulder responsibility with respect to the remaining stages of development looking toward commercial production. The current program, supported by congressional appropriations, will be completed as I am sure Congress intended. However, we have heretofore indicated to Congress that this will carry the development work about as far as is justified or necessary at this time unless there is a real interest on the part of industry and financial support from outside. We have proven that oil can be removed from these shales and refinement of the process is all that remains to be done.

I would like to refer briefly now to the matter of health, safety and coal-mine inspection activities of the Bureau. The Secretary has not recommended that any of this work be discontinued and it was unfortunate that any such conclusion was drawn. As a matter of fact, the survey team's report did a great deal to recommend that these functions of the Bureau be strengthened and the Secretary heartily endorsed this policy. As a result, it is proposed to have a new Assistant Director whose sole responsibility will be that of health, safety and coal-mine inspection. A major effort will be directed to educational work in this field and the Bureau will increase its cooperation with States in an effort to bring all such inspection services to the general standards of the Bureau's coal-mine inspections. Several miscellaneous recommendations designed to improve the administration of this work were approved by the Secretary but he reserved judgment on the recommendation of the survey team that inspectors notify operators and mine-safety committees in advance of inspections.

The Department certainly supports in every way the need for an adequate mine-safety program and, of course, it recognizes fully that this is a subject which the Congress has concerned itself with for many years and has passed appropriate legislation.

Perhaps the fear that the Bureau of Mines might discontinue its very effective work in this field arose from the conclusion of the survey team that if all of its recommendations were carried out, "the need for Federal coal-mine inspection will decrease and eventually cease to exist." This was a conclusion of the team. It was not a recommendation and certainly it is not a recommendation of the Department. The time may come when it would be appropriate to consider a curtailment or substantial reduction of the Federal program but such is certainly not the case today.

Again I would like to express my appreciation for the opportunity that Chairman Miller has given me this morning to discuss these important matters with you. If the chairman and the committee so desire I will be glad to leave with you

for the record, a copy of the report of the survey team of the Bureau of Mines and a copy of the memorandum of approval of the report by the Secretary.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington 25, D. C., July 1, 1954.

Memorandum.
To: Director, Bureau of Mines.
From: Assistant Secretary Wormser.
Subject: Reorganization, Bureau of Mines.

On May 20, 1954, the survey team submitted its report on the organization and operation of the Bureau of Mines. This report is the result of a comprehensive and impartial review of the Bureau's current management procedures and practices, and the recommended changes are designed to enable the Bureau to provide services even better than those which have so greatly benefited the public in the past.

The report of the survey team is hereby approved except for recommendation No. 5 which is reserved for further consideration. The report has been examined carefully by me, it has been reviewed by others in the Office of the Secretary, and copies have been made available for study within your office. During conferences with the survey team and in general discussions with you, I have been pleased to learn that many of the suggestions contained in the team's report have been placed into effect or will receive implementation within the near future.

The Director of the Bureau of Mines is directed to carry out the recommendations of the report, except as noted above, and except for recommendations Nos. 14, 17, 33, and 36. The Assistant Secretary—Mineral Resources will assume primary responsibility with regard to these latter recommendations.

Attention should first be directed toward effectuating recommendations Nos. 1, 19, 20, and 21. A definite time schedule for carrying out these recommendations for reorganization within 6 months from this date should be adopted which will enable routine activities to continue without undue disruption. I am asking that provision be made for a new position of Deputy Director of the Bureau in the organizational scheme.

As soon as possible, recommendations Nos. 22, 23, 37, and 38 should be accomplished in order that the economies anticipated by these recommendations can be promptly obtained.

All comments and recommendations as to the need for the improvement of external, interdepartmental, or intradepartmental relationships necessary for the fulfillment of the recommendations of the report as approved, shall be submitted at your early convenience for necessary action by the Secretariat.

July 1, 1955, is established as the target date for full implementation by the Bureau of recommendations assigned to it for action. Reports indicating progress in implementing each recommendation shall be submitted to the Assistant Secretary—Mineral Resources on September 1, 1954, December 1, 1954, March 1, 1955, and July 1, 1955. A copy of each of these reports shall be sent to Mr. Raymond Davis, Assistant to the Secretary.

If the Director believes, during the course of effectuating the recommendations, as approved, that significant modifications should be made, he shall submit recommendations in such regard to the Assistant Secretary—Mineral Resources for prior approval by him and by the Under Secretary before taking action. Minor modifications may be accomplished by the Director where in his opinion the change does not represent a significant departure from the views of the survey team as indicated in the report.

Necessary changes to be made in the Official Organization Handbook should be prepared and submitted to the Administrative Assistant Secretary.

Copies of the survey team's report, as well as copies of this memorandum for attachment, have been made and should be widely distributed within the Bureau of Mines, including field offices, and to interested parties.

A press release concerning the report and its initial implementation will be prepared under the direction of the Director of Information. Further releases, as justified by accomplishments, will be prepared in a similar manner.

I wish to thank you and, in turn, wish you to express to the personnel of the Bureau of Mines my thanks for their excellent cooperation with, the interest in, and contributions to the work of the survey team. Without this fine spirit, the recommendations of the team could not have been as constructive, as I believe

they are, in the interests of securing the best possible service from the Bureau of Mines to the American people.

FELIX E. WORMSER,
Assistant Secretary for Mineral Resources.

Approved:
RALPH A. TUDOR,
Under Secretary.
Approved:
DOUGLAS MCKAY,
Secretary of the Interior.

SURVEY REPORT, BUREAU OF MINES

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington 25, D. C., May 20, 1954.

Memorandum.
To: Assistant Secretary Felix E. Wormser.
From: The Secretary's Survey Team for Bureau of Mines.

We take pleasure in presenting to you the report of the team appointed by you on November 30, 1953, to investigate the organization and operations of the Bureau of Mines.

Respectfully submitted.

J. R. BUTLER.
J. C. KINNEAR, SR.
DENNIS L. MCELROY.
SPENCER S. SHANNON.
CURTIS L. WILSON, *Chairman.*

CONDUCT OF SURVEY

The survey team of the Bureau of Mines was appointed November 30, 1953, by Felix E. Wormser, Assistant Secretary of the Interior, with approval of the Secretary of the Interior, Douglas McKay. (See appendix for memorandum of authorization.)

The survey team began its study in Washington on December 14, 1953, completing its work as a group on April 23, 1954, and during this period of approximately 4 months, 72 working days were devoted to this study.

Following brief conferences with departmental officials and key personnel of the Bureau in Washington, the team spent 7 weeks in the field. During this period it visited all regional offices (excepting Juneau, Alaska) and the majority of field-research stations, and interviewed a number of health, safety and coal-mine inspection officials. The survey team as a group met with approximately 150 employees of the Bureau and held informal discussions with some 80 representatives of mineral industries, universities, and State governments. All conferences and interviews were informal and without questionnaire.

The team returned to Washington from the field on March 9, 1954. The remainder of the time was spent in conference with Bureau officials and others and in the writing of this report.

Henry P. Caulfield of the technical review staff and George E. Robinson of the Office of the Administrative Assistant Secretary served as staff assistants to the team.

PREFACE

In a report of this nature it is important that its contents deal principally with matters which require a change or different emphasis, rather than dwell upon matters concerning the organization and its activities which do not call for change. As a result, readers of this report may gather from it an undue feeling of criticism of the Bureau.

This would be unfortunate because the survey team is fully cognizant of the fine contribution the Bureau makes to our national security and well-being through scientific and technologic research, promotion of health and safety in mines, and appraisal of mineral industry problems. The team has great respect for the Bureau's past and present accomplishment and for its capacity to achieve future accomplishments. Its aim has been to make constructive recommendations that will help the Bureau make a greater contribution to our national interest in the future than in the past.

To have achieved its present notable record, well-trained, experienced and devoted personnel were required. The Bureau has many such personnel. Their interest is based upon confidence in the true value of their work and certainly not from its personal monetary return, which compared to industry is generally low for technical personnel. This interest is accompanied by sincerity, earnestness, and frankness in facing the problems of the Bureau.

That the Bureau has problems and that there are important differences of opinion within the Bureau and elsewhere with regard to their solution, is generally recognized. Many in the Bureau have felt the need for an independent appraisal, and showed a genuine interest in new ideas that might improve the work of the Bureau, and welcomed the team's efforts in this light. Many of the recommendations contained in this report had their inception from the ideas of persons interviewed, and in many other ways Bureau personnel courteously and efficiently assisted the survey team in the achievement of its aim.

The successful implementation of the recommendations contained in this report, if adopted by the Secretary of the Interior, will depend upon the personnel of the Bureau. The survey team hopes that this report, as a response in kind to the spirit of devotion, sincerity, and frankness of Bureau personnel, and the merit of its recommendations, will engender agreement within the Bureau. Thus, it is hoped that the report will inspire the unity that is essential to the successful implementation of these or any other recommendations.

PART I. SUMMARY OF RECOMMENDATIONS

Introduction

The survey team was appointed to investigate the organization and operating procedures of the Bureau of Mines and present recommendations for improving efficiency and effectiveness of the Bureau in line with administration policy.

The team was given broad scope in which to develop its recommendations and allowed to use its own discretion in the conduct of the survey. The basic consideration was to improve management of the essential functions of the Bureau. The team realizes that there are difficulties encountered in generating desired economy measures from within by any bureau. It is earnestly hoped, however, that where savings can be made they will be so generated within the Bureau, rather than forced upon it from sources outside the Bureau.

The effectuation of the following recommendations is based upon the general concept that the changes in the organization and procedures, for increased efficiency and reduction of costs, if adopted, must be accompanied by full acceptance and cooperation by the entire supervisory personnel of the Bureau.

Among the recommendations made by the survey team, four basic recommendations are:

(*a*) That the number of regions be reduced from 9 to 4;

(*b*) That administration of health, safety, and coal-mine inspection activities be separate and apart from scientific and technical research activities;

(*c*) That there be a coordinated strengthening of all statistical and commodity analysis work;

(*d*) That a plan of organization be adopted under which the Washington office retains responsibility for policy and program determination, while conduct and management of research are decentralized.

The following is a listing of all of the recommendations for changes in organization and operating policies and procedures of the Bureau. Each of these recommendations is discussed in detail within the body of the report. It is recommended:

1. That the form of organization shown in charts III and IV and map II, as described in its functional and geographical aspects in part III, be adopted for the Bureau (p. 5).

2. That the work of 2 or more stations be combined into a single station, or that single stations be eliminated and the work distributed to 1 or more stations where facilities and space are available. (p. 11).

3. That in health, safety, and coal-mine inspection, a major effort be directed to educational work (p. 16).

4. That the Bureau increase its cooperation with State mine-inspection departments, miners, and operators, to bring all State inspection services up to the general standard of the Bureau's coal-mine inspections (p. 16).

5. That inspectors notify operators and mine-safety committees the day before an inspection is started in order that arrangements can be made to facilitate the inspection (p. 17).

6. That changes in interpretation of the safety code by the Bureau be made available to the miners and management before being put into effect (p. 17).

7. That the reasons and the need for increasing the minimum number of inspections to three per year for all title II mines be determined (p. 17).

8. That the present method of qualifying inspectors be revised to include a written examination on mining and safety practices and methods (p. 18).

9. That the present form of inspector's report be revised so that time is not wasted on repetition of narrative details and be confined to pertinent facts of the inspection (p. 18).

10. That the Bureau officials in Washington concerned with programing the work of the mining divisions in the field be alert to any decline of Defense Minerals Exploration Administration and Atomic Energy Commission activities, with a view to the adoption of an appropriate long-range program which would indicate clearly to all concerned their general mission (p. 18).

11. That increased attention be given by regional directors to maintaining proper coordination between the mining and metallurgical divisions in order that any particular project pursued by one division with negative results in its particular field will not be initiated or pursued within the field of the other (p. 19).

12. That research work on a particular ore or metal be confined insofar as possible to a single station to avoid unnecessary duplication (p. 19).

13. That the maintenance and operation of the large ore-dressing pilot plant at Boulder City be discontinued (p. 19).

14. That the Bureau should not engage in production activities, and should do everything possible to terminate present production activities (p. 20).

15. That the Bureau should reexamine its research efforts in the solid fuels area, redirect them to the greatest possible extent along unexplored lines having long-run significance, and avoid those types of research which industry is undertaking or can readily undertake itself (p. 21).

16. That a thorough review of the routine testing of commercial explosives be undertaken and that this testing be promptly terminated (except with regard to applications for permissibility of new explosives) if it is not really important as a means of maintaining the permissibility of explosives being used by industry (p. 21).

17. That the experimental work done solely by the Bureau on the production of oil shale and oil from shale at Rifle, Colo., should cease, and that no further work be done with the new retort unless there is a substantial contribution by industry under a cooperative agreement (p. 23).

18. That the research work on synthetic gaseous and liquid fuels from coal and lignite be confined to small-scale activity and not expanded and developed into large pilot and demonstration plants (p. 24).

19. That there be unified direction of data collection, analysis, and policy appraisal for minerals and fuels; more timely publication of statistical data; and reduction of cost to a minimum for collection and processing of statistics (p. 25).

20. That the administrative staffs in regional offices should be strengthened by placement, with emphasis upon reassignment, of persons with broad capabilities and qualifications in adminstrative management (p. 27).

21. That the Washington staff of the Administrative Division (except the proposed Administrative Branch, Washington) confine its activities to giving advice and guidance to the Director (p. 27).

22. That the present program of disposal of excess property be vigorously pursued, with deadlines established for its accomplishment (p. 28).

23. That the inventory of automotive equipment be substantially reduced; that the Bureau establish use requirements for motor vehicles; and that the Bureau investigate the practicability of renting vehicles from commercial firms to meet peak requirements (p. 28).

24. That the Bureau, through its regional offices, take steps toward solving the shortage of technical personnel by the establishment of college trainee positions, and the formation of recruiting programs for each region (p. 28).

25. That the Bureau carry on a supervisory training program in executive development and management (p. 29).

26. That the term "project" be used only in connection with Bureau activities where definite scientific, technical, or analytical research objectives are to be

obtained by the work performed in some presumed period of time, and not in connection with continuing analytical, testing, production, administrative, and service functions (p. 29).

27. That projects be large enough to facilitate efficient administration (p. 30).

28. That in the interests of economical conduct of research, no project be authorized, or its authorization continued, unless sufficient funds can be allocated to conduct the project at an economical and efficient rate (p. 30).

29. That cost accounting records be maintained on a project basis in order that total costs (excluding clearly defined nonallocable costs) for each project can be readily and routinely available to the management of the Bureau (p. 30).

30. That the Director utilize more fully the regional directors and their key staff in the preparation of the budget and in the allocation of funds after appropriation by the Congress (p. 31).

31. That the status of programs and projects be shown annually in a report which also forecasts the planned duration of each project and expenditure rate for the full period (p. 31).

32. That "pioneer projects" which were found operating in a few regional research divisions, be more widely approved for the purpose of enabling the development of worthwhile research project proposals (p. 32).

33. That advisory committees be established and regularly consulted in connection with the functions of the Bureau, particularly in connection with mine health and safety matters and with respect to minerals, solid fuels, and petroleum and natural gas research (p. 32).

34. That increased attention be given to cooperation by the Bureau with mineral and geologic departments of the individual States (p. 32).

35. That, where possible, the Bureau resume the type of cooperative research which it formerly conducted with universities and colleges (p. 32).

36. That the Assistant Secretary—Mineral Resources establish a more definite policy governing cooperative, trust and working funds; and such policy should be implemented by the Bureau through necessary regulations, delegations of authority, and procedures for approval (p. 33).

37. That the general practice of having machine and wood shops as part of the facilities of each station be discontinued; that reliance be placed as much as practicable upon contracting for necessary services in this regard; and that machine shops of appropriate size and equipment be limited to one, or possibly two, per region, depending upon need (p. 34).

38. That all other facilities and services, provided as facilitating services to research projects, be drastically reduced, and much greater reliance placed upon contracting for such services as needed (p. 34).

39. That the general policy of free distribution of the Bureau's output of publications be changed to a general policy of charging an appropriate price, with exceptions to this policy being permitted in carefully considered cases (p. 35).

PART II. FUNCTIONS AND ORGANIZATION

The Bureau of Mines was established in 1910 as an outgrowth of public concern with the problem of mine disasters.

The Organic Act, as rewritten in 1913, provides for functions aimed at: (*a*) improving health and safety conditions in mines; and (*b*) increasing efficiency, economic development, and conservation of mineral substances, including fuels, through scientific, technologic and economic research.

Since its inception the program has expanded, reinforced by subsequent supplementing legislation and delegated responsibility to include:

(*a*) Helium production (1925).

(*b*) Government exploration for strategic and critical materials in the interests of national security (1939).

(*c*) Coal mine inspection (1941) and regulation of coal mine safety (1952).

(*d*) Control of fires in inactive coal deposits (1949).

(*e*) Technical service to defense mineral exploration, development, and production contracts (1950).

The Bureau has also assumed responsibilities placed upon it for foreign technical assistance and for such research and production programs as those for zirconium and titanium.

The distribution of expenditures during fiscal 1953 among these functions, based upon data supplied by the Bureau, is roughly as follows:

	Percent of total
Scientific and technical research, including Government exploration	60
Material production, helium, titanium, zirconium	20
Mine safety, education and inspection	10
Commodity and economic analysis, including collection of statistics	6
Technical service on defense mineral exploration, developments, and production contracts Mine fire extinction Technical assistance abroad Testing and analysis, excluding that connected with research or mine safety	4

As the Bureau's program grew, the problem of formal organization and proper management procedures to carry out its functions became important. The problems of organization and management increased further as the number of personnel and field stations increased. In 1939, the Bureau had less than 1,000 employees. Subsequently, employment rose to a level more than five times 1939 employment; it is now 4,823 persons. The locations where there is a significant number of personnel, excluding those connected with health and safety, have increased from 20 to 35 since 1939.

Previous organization

Prior to 1939, the Washington staff of the Bureau was organized on a combined functional and commodity basis into a total of 14 divisions, of which 6 commodity divisions reported to a Technologic Branch, 6 commodity divisions reported to an Economics and Statistics Branch, and 2 divisions reported to a Health and Safety Branch. Field stations reported directly to Washington divisions according to the nature of their work.

The first major reorganizational response to the increased workload, personnel, and number of stations was the creation in 1942 of three regions—western, central, and eastern—for supervision of all metallurgical and mining activities. Each regional director reported directly to the Bureau Director and a small programing staff assisted the Director in managing the operations conducted under the supervision of the three regional directors. The top management of the Bureau during this period planned to regionalize fuels and explosives activities and possibly other work, but this was not carried out. This first attempt at regionalization was abandoned in 1946. A mixed functional-commodity type organization was restored, with six divisions to which the field stations reported (chart I).

Present organization

In 1949, the present organizational plan was developed and put into effect (chart II). The principal objectives were to create an organization reflecting:

(*a*) Clear division between policy and programing on the one hand and operational activities on the other.

(*b*) Distribution of research funds on a commodity basis (minerals, coal, petroleum, et cetera) rather than on a functional basis (mining, metallurgy, et cetera).

(*c*) Decentralization of administrative activities—personnel, fiscal, property management, and purchasing.

(*d*) Regional structure for Bureau activities to facilitate general management; contact with industry, States and the public; and interbureau coordination.

In addition to these specific objectives, it was believed that the total effect of the reorganization would be a relative decrease in administrative costs, a decline in the amount of time technical personnel had to spend upon administrative matters, and a general increase in efficiency and effectiveness of the Bureau.

Observations on present organization

In the light of these objectives, the survey team has the following general observations to make with regard to the operation of the present organization:

(*a*) Key Bureau personnel differ widely in their views as to the desirability, effectiveness, and economy of regional as compared to commodity-functional organization.

(*b*) In certain regions where there has been an effort to develop an understanding of, and to enforce, proper procedures and where the work of the region has been associated with those parts of the Bureau in Washington most sym-

pathetic to regionalization, there is support for, and very little criticism of, regionalization. Criticism in these regions is confined to infraction of proper procedure and to complaints that not enough authority has been regionalized.

(c) Where the opposite tends to be the case, there is strong opinion that the Bureau should return to the previous type of organization under which each station reported directly to the most appropriate division or branch in the Washington office; that the regional director does not make any contribution to the work of the Bureau, except perhaps on administrative matters; and that since some feel that decisions have to be made in Washington, they should not be delayed by going through regional directors.

(d) Actual practice as regards regionalization in the Bureau differs considerably and tends to follow the particular inclinations of the key personnel involved, notably of the division and branch chiefs in Washington.

(e) The divisions and their branches in Washington in varying degrees tend to act, not as staff to the Director, but as line officials responsible for the Washington operations and field activities associated with their interests. Authority and responsibility in practice appear in some cases to rest in the division and branch chiefs. In a number of instances instructions, and other communications interpreted as instructions in the field, go to the regional directors from division and branch chiefs rather than from the Director, to whom the regional directors report. Sometimes these communications bypass the regional directors. The Assistant Director is not a deputy to the Director; thus he is not formally in position to coordinate instructions to the field and have them issued over his signature when the Director is not available, except when he is Acting Director.

(f) The position of Assistant Director for Programing, which was contemplated in the 1949 reorganization was not established for some time thereafter and has been left unfilled for considerable periods.

(g) The Chief Mining Engineer, the Chief Metallurgist, the Chief Economist, and the Chief Fuels Technologist have not been used effectively in the programing process. Their activities have been confined largely to technical consultation inside and outside the Bureau.

(h) The Health and Safety Division appears to be the most self-contained and least dependent upon other staff groups within the Washington office, but it also appears to be the most closely supervised by the Director. The Director's personal interest in this work is very strong in view of his long years of service in this important field. Because the work itself, and the problems involved in its management, are very different from the Bureau's research functions, its independence of other units in the Washington office is understandable.

(i) The problems involved in the management of research and other Bureau work do not appear to require the autonomy exercised by the Minerals Division and the Fuels and Explosives Division. The assumption by each of these Divisions of rather complete responsibility and authority for all matters involved in their commodity areas appears to have led to the following results:

(1) The Divisions do not confine themselves to programing and appraising results of research and other field work. In many instances they get involved in the conduct of this work, thereby decreasing the authority and responsibility of the field personnel.

(2) The regional directors are not able, or do not feel able, to exercise authority and responsibility for the general management of field activities commensurate with their position, because of varied conceptions in Washington about how the problems of the Bureau are to be handled and the tendency of division and branch chiefs to act with autonomy.

(3) The desirable coordination of foreign and domestic commodity and economic analysis, of collection and processing of domestic statistics, and of foreign regional analysis is made difficult by the present organizational structure. This is due to the dispersal of authority and responsibility within the Minerals Division and the Fuels and Explosives Division, the amalgamation of this type of work with other activities of the Divisions, and the existence apart from the divisions of the Office of Chief Economist and of the foreign region. As a result, the Bureau has been less responsive to requests for data, analyses, and advice from the Office of the Secretary and other Government agencies than it needs to be. Thus there is a tendency, particularly in other Government agencies, to set up staffs to perform analyses, to collect and process statistics, and to render advice on mineral policy which the Bureau itself should be expected to do.

PART III. RECOMMENDATIONS FOR REORGANIZATION

It is recommended (1) that the form of organization shown in charts III and IV and map II, as described in its functional and geographical aspects in part III, be adopted for the Bureau.

Functional organization

The survey team, after fully considering the above observations, as well as other facts and opinions, has formulated certain criteria for appraising alternative organizational structures. Ever present in its mind has been the fact that competent and responsive people in the organization are much more important than organizational structure.

The survey team believes that the organizational structure should—

(*a*) Be best adapted for performance of the Bureau's principal functions: (1) to promote the health and safety of miners; (2) to conduct scientific and technologic research in cooperation with industry, universities, and States in the interests of national economic welfare and security; and (3) to provide statistical service generally as well as to provide economic and commodity analysis, and mineral policy advice for the Department and other agencies of the Government;

(*b*) Reflect the distinction between policy and programing on the one hand, and the conduct of research and other work on the other;

(*c*) Enable programs for conservation and development of mineral resources to be formulated and presented to the Office of the Secretary, Bureau of the Budget, and the Congress by commodities, but without fostering commodity competition for appropriations;

(*d*) Provide for advice in program determinations, as to: (1) scientific merit and feasibility; (2) economic significance and importance to national security; (3) availability of adequate space, equipment, and qualified personnel within the Bureau or made available to it through agreements; and (4) relationship to work of industry, States, and universities in order to avoid duplication of effort and to develop cooperation;

(*e*) Make possible strong general management both in Washington and in the field in order to: (1) promote and enforce sound, economical, and uniform operational procedures; (2) minimize the cost of facilitating services; and (3) utilize most effectively the existing personnel, equipment, and facilities;

(*f*) Promote the concentration of field activities into fewer stations; and

(*g*) Be designed to reduce administrative costs such as processing of personnel actions; disbursing, accounting, and auditing operations; purchasing; and control of supplies and equipment.

Duties and responsibilities of various officers and organizational units indicated in charts III and IV are suggested to be as follows:

Director.—The Director, by virtue of the authority vested in him by specific act of Congress or delegated by the Secretary of the Interior, should primarily concern himself with: (*a*) establishment of policy concerning the work of the Bureau; (*b*) management of the Bureau through appropriate delegation of his authority, establishment of basic operating procedures, and selection of key personnel; (*c*) resolution of issues concerning the Bureau's programs; (*d*) rendering of advise on mineral policy to the Assistant Secretary for Mineral Resources; (*e*) responsibilities which he cannot delegate to others; and (*f*) the relations of the Bureau with industry, the States, other research organizations, and the public generally.

Assistant Director for Health, Safety and Coal Mine Inspection.—This official, under a delegation of authority and responsibility from the Director, should be in charge of the health, safety, and coal-mine inspection work of the Bureau. He should have the staff assistance of a Coal Mine Inspection Division and a Health and Safety Division. Within the latter division, staff should be provided in connection with health, safety, education, accident statistics, and mine fire control. This activity should be conducted separately from the regional organization of the Bureau except that it should utilize the services of the administrative staffs of the regions and other field units wherever possible.

Assistant Director for Program.—This official, in a staff relationship to the Director, should concern himself continuously with development of commodity research programs, problems of balance as between programs, and consideration of specific project proposals. In this work he should obtain the advice of the chiefs and staff for research appraisal, mineral industries, regional activities,

and administration; appraise this advice and resolve conflicts in it, insofar as possible; and crystallize this work into programs (at least as often as necessary in connection with budgetary operations and decisions) for presentation to the Director for final resolution of any issues. He should have the services of an assistant of adequate grade and professional stature to assist and represent him in the performance of his duties. In addition, he should have the services of a project control officer to maintain the official records of, and status on proposed and authorized projects; and assure proper, effective, and timely routing of project proposals, progress reports, and final reports for staff consideration.

Research appraisal staff.—This staff should be composed principally of senior scientific and technical men of the Bureau who are recognized as authorities in their fields. It should be presided over by a chief of broad scientific and technical knowledge. Each of the top members of the staff should have an assistant chief as well as a lesser grade professional assistant. This latter position should be filled by a system of rotation with personnel having technical research field experience. This relatively small staff is considered sufficient to perform the following duties: (*a*) appraisal of project proposals and advice on their scientific merit and feasibility; (*b*) following the progress of research projects through reports and visits, at least yearly, by the chiefs or assistant chiefs to each project of professional concern to them; (*c*) recommendation of changes in, or cancellation of, project authorizations when necessary or desirable; (*d*) final scientific and technical review of reports, circulars, and other such publications; (*e*) advice on proposed appointments of field technical division chiefs or any other proposed higher level technical appointments that must be referred to Washington for final decision; and (*f*) technical consultation with other agencies of the Government, with industry in appropriate circumstances, and with foreign governments on technical assistance missions or otherwise.

Chief of regional activities.—This official is in charge of the work of the regional directors. He should also serve as the representative of the regional directors and of the field point of view in program, project, and other staff discussions in Washington. He is not considered to be a deputy director. Therefore, his authority and responsibility for issuing instructions to the field over his own signature, should be clearly defined by the Director in such a way that he cannot take action on matters pertaining to, or substantially relating to, staff responsibilities of other Washington staff officials without their approval.

In connection with program and project decisions, the Chief of Regional Activities should advise on: (*a*) availability of facilities, equipment, supplies, and personnel at field stations, and implications in project proposals of need for their further acquisition, to the end that cost can be fully considered; and (*b*) the equity, in terms of relative benefits and costs, and general soundness of proposed cooperative, trust fund and working-fund agreements between the Bureau and others. It is important to locate research projects near the place where cooperation with industry, States, and universities can best be obtained. It is also important to conduct research at minimum cost. The Chief of Regional Activities must concern himself with both of these considerations. Above all, he should guard against the tendency in any regional organization of excessive regional aggrandizement.

In view of his responsibilities for general management in the field, the Chief of Regional Activities should also give particular attention, in conjunction with the Chief, Administrative Division, to minimizing the cost of necessary facilitating and administrative services. Like the manager of a competitive enterprise, he should be concerned with reduction of cost, and full reimbursement of all true costs, of certain relatively routine technical operations of the Bureau. These operations include the production of helium, titanium, and zirconium; routine analysis and testing of coals and boiler waters; and services to Defense Minerals Exploration Administration and General Services Administration.

The staff of the Chief of Regional Activities should be kept very small and of high caliber.

Mineral Industries Division.—The Bureau's work pertaining to minerals and fuels commodity analysis, economic analysis, foreign regional analysis, collection and processing of domestic statistics, and procurement of statistical and other data from abroad should be centered in this Division. The Division's work should be directed toward: (*a*) advice on the importance of commodity research programs and on the significance, from a national security and economic point of view, of successful completion of proposed research projects; (*b*) response to appropriate requests originating within the Bureau, the Office of the Secretary,

or other Government agencies for data, analyses, evaluations of alternative policies, and expert advice; and (*c*) production of the Minerals Yearbook and other appropriate publications for use by industry and the public.

The Chief of the Division should have an assistant who should be responsible for production of the Minerals Yearbook and all other regular publications produced by the Division. The commodity analysis work of the Division should be performed by Petroleum and Natural Gas, Solid Fuels, and Minerals Branches which should be staffed with the type of experts now employed by the Minerals Division and the Fuels and Explosives Division. The Economic Analysis Branch should be staffed with professional economists, and should include analytical work now performed in the Office of the Chief Economist. The Foreign Region Branch should include the work, except technical assistance work, now performed by region IX and should be organized by foreign geographical areas. The Statistics Branch should be concerned solely with the collection and processing of domestic minerals and fuels statistics on a least-cost basis as a service to, and in cooperation with, the analytical branches. It should be headed by a professional statistician who is expert in the most modern and economical statistical collection and processing techniques and in the design of statistical programs. Decisions as to the need, scope, design, definitions, tabulations, and the like should be made at the division level in consultation with the branches of the Division.

Administrative Division.—It is believed that decreased emphasis upon administrative operations in Washington and field stations and increased emphasis upon such operations as the four recommended regional headquarters should produce the most economical, efficient, and effective handling of these operations, if adequate authority, as discussed on page 26 is delegated to the regional directors. In accord with this general concept of the Administrative Division in Washington, the chiefs of its branches except the Chief, Administrative, Washington, under whom Washington administrative matters are handled), should act as staff advisers to the Director through its division chief only in connection with: (*a*) Decisions where authority to act has not been delegated to the field and to the Administrative Branch, Washington, such as high level personnel actions and large purchase contracts; and (*b*) policies and procedures aimed at reducing to a minimum the costs of administrative operations within the requirements of law, regulations, and Secretarial Orders. The staff of the Administrative Division should be confined to a few high level administrative experts who should be under instruction to visit the regional offices and a number of stations, at least once a year, to discuss general administrative problems which require Washington action for solution. They should also keep in contact with administrative activities through regular reports. The Administrative Division should work closely with the Chief of Regional Activities in promoting more efficient and less costly administration.

Regional directors.—The survey team's concept of the regional director is that of a general manager of Bureau operations who is competent in the mineral or fuel field predominant in the region to which he is assigned. He should be held responsible for efficient, economical, and effective operations; for relations with industry, States, universities, and the public; and for coordination of Bureau activities with those of other bureaus in the Department and other Federal Government agencies within his region. All personnel actions affecting his region should ordinarily be taken either by him or upon his initiative. No personnel action should ever be taken without prior consultation with him. Under no circumstances should Washington actions having the effect of instructions be communicated to the field except through him, and all matters that must be referred to Washington should go through the regional director. In his consideration of project proposals his approval would not necessarily be based only upon his personal scientific knowledge even though he may be an expert in the particular field. His recommendations should be based primarily upon: general feasibility in terms of facilities, equipment, supply and personnel; appropriateness as a Federal Government project; appropriateness of a cooperative, trust, or working fund arrangement; and the regional significance, if any, of the project.

Chiefs, regional technical divisions.—The survey team's concept of the job of chief of a regional technical division is that of research director. Everything should be done by the regional office to lighten administrative burdens upon him and his technical staff. The primary functions of the chief and his staff should be: (*a*) The conduct of scientific and technical research under

authorized projects and programs; and (*b*) the proposal of new projects which in their judgment have scientific and technical merit, probable feasibility, and which otherwise appear to them to be appropriate for Bureau research.

Regional mineral industries divisions.—The survey team believes that the following functions should be performed by a regional mineral industries division: (*a*) Collection of statistics, as directed, limited to mail-out, followup, and editing; (*b*) performance and coordination of work in connection with departmental field committees and river basin studies, or other interagency tasks; (*c*) transmission to public of technical information; (*d*) assistance to the regional director in his relations with industry, States, and the public; and (*e*) leading the participation in carefully selected and planned projects for regional mineral industries studies in cooperation with technical experts from other regional divisions.

The survey team believes that much of the work of these divisions, other than statistical collection, should be conducted jointly with experts from other divisions within the region. Considerable reliance for assistance should be placed upon these experts. Primary emphasis in the statistical function should be placed upon maintenance of close contact with respondents.

The staff of the divisions can and should be kept small. In order that the divisions can provide a unique professional contribution within the regions, the personnel should be chosen primarily for their training and experience in business, economics, industrial accounting, statistics, or public relations, and to a lesser extent for their technical background.

Chief, central services division.—The survey team believes that better nationwide usage of the central administrative services now provided at Pittsburgh would be obtained if these were put under the direction of a chief, central services division, who would report to the director of proposed region IV, but carry out his responsibilities in accordance with the clear policy of serving the entire Bureau. It would appear that at least the following activities should be included in this division: Publication processing and distribution, motion-picture distribution, and central photographic laboratory. The guiding policy in the conduct of these functions should be adequate service at minimum cost.

Organization of production activities.—In order that cost-conscious management may be assured within the regional organization for production activities, as in helium, titanium, and zirconium, separate organizational units are essential. This same principle of separate organizational units should apply to the activities of the Bureau in routine testing and analysis, such as coal and boiler water testing.

Assistants to the Director.—The Director should be provided with a minimum number of assistants to perform specialized staff assistance, such as that now performed by the Office of Mineral Reports; by region IX in connection with foreign technical assistance activities; by the Office of the Solicitor; and that required for formulation and implementation of delegations of authority, changes in organization, and revisions of reporting and other procedures.

Geographical organization

It is the opinion of the survey team that the cost of operating the Bureau, insofar as current field operations are concerned, can be reduced in two ways with respect to its geographical organization and still maintain the present level of research activities:

(*a*) As provided in recommendation No. 1, the number of regions into which the activities are divided should be reduced from 9 to 4. (See maps I and II.)

(*b*) A consolidation of field activities into fewer stations should be pursued.

It is recommended (2) *that the work of two or more stations be combined into a single station, or that single stations be eliminated and the work distributed to one or more stations where facilities and space are available.*

Observations made in the field have disclosed the existence of certain conditions which, for reasons of economy, require rearrangement, adjustment, and correction. In considering the consolidation or closing of a station which may be located on a college or university campus, the advantage of such relationship to the projects being carried on there should be carefully considered.

The team has inspected some completed stations which at present are only partially occupied, with no plans for complete occupancy. The team has inspected large stations nearing completion for which there are no definite plans for complete occupancy.

The Bureau is faced, for example, with the fact that the new station in Morgantown, W. Va., an imposing structure, which is soon to be completed and contains space in the amount of 88,345 square feet, is without sufficient work

for full utilization. Thus, it is without sound economic reason for its existence. It is an outstanding example of a new facility concerning which sufficient consideration and study prior to approval and construction apparently was not given. The team can envision no justification for the repetition or genesis of similar situations in the future. The approval by the Bureau of the construction of new stations should be made only after complete, exhaustive, and comprehensive study of necessity, location, functions, and size, separate and apart from the insistence of pressure groups in the interest of certain locations or areas.

In the reduction of regional offices, the activities of the Bureau have been divided geographically into four regions following State lines insofar as feasible. The objective has been to group the States or areas into regions so that the work pertaining to certain fields of research be predominant and thereby be given emphasis. It is recognized, however, that it is impossible to limit the number of regions to an efficient minimum and at the same time to delineate regions which are wholly inclusive of certain specific resources.

Region I.—The States of Washington, Oregon, Idaho, California, Nevada, and the Territory of Alaska, are included in this proposed region.

The major research activities in the States are in the field of mining and metallurgy, together with production and research in titanium and zirconium. Some research is also devoted to petroleum, natural gas, and solid fuels.

Reno appears to be the logical location of headquarters for this proposed region. Aside from its favorable geographical location as regards air, rail, and automobile transportation, advantage could be taken of the large new plant of the Bureau now nearing completion. The size of this plant is far in excess of the demands of the present local organization, and information gained during the inspection points to the fact that a great deal of space will be unoccupied. The building now being completed contains approximately seven times as much space as the buildings in which the station is now operating. The city is of such size that housing should not be a great problem. Close contact can be maintained by regional headquarters at Reno with the branches and stations in this proposed region.

The regional headquarters at Juneau,[1] Albany, and San Francisco can thus be eliminated.

Region II.—The States of Montana, Wyoming, Utah, Colorado, Arizona, New Mexico, North and South Dakota, and Nebraska, are included in this proposed region.

The predominant interest of the Bureau in this region is in minerals and metals, while research in solid fuels, petroleum and natural gas is also performed.

Denver appears to be the logical regional headquarters for this region, as it is a major center of the intermountain area. Government-owned buildings are available for the Bureau's activities, transportation facilities are excellent, and it is centrally located within the region.

Region III.—The States of Kansas, Missouri, Arkansas, Oklahoma, Texas, Mississippi, Louisiana, Florida, and lower Alabama, are included in this proposed region.

This proposed region is so delineated that it contains a great portion of the present and potential petroleum and gas reserves of the United States. Special emphasis on petroleum and natural gas research is therefore logical.

Tulsa or Bartlesville is suggested as the regional headquarters. Both are more centrally located than Amarillo, where commercial space is now being rented.

Region IV.—The States of Minnesota, Wisconsin, Michigan, Iowa, Illinois, Indiana, Ohio, Pennsylvania, West Virginia, Virginia, Maryland, Tennessee, Kentucky, Alabama, Georgia, North and South Carolina, Delaware, New Jersey, New York, and the New England States are included in this proposed region.

The research in this region is principally in solid fuels, iron ores, associated metals, and to a lesser degree, in petroleum and natural gas.

Because the total space available in Pittsburgh, Bruceton, and Morgantown is in excess of the needs of the Bureau, the survey team believes that one of these stations should be closed and disposed of, and the regional headquarters located in one of the remaining two.

The elimination of the Minneapolis and Knoxville regional offices is brought about by this recommendation.

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[1] The abolition of the Alaska region is recommended on the basis of a general analysis of the Bureau's geographical organization. The survey team made no on-the-spot investigation because all departmental activities in Alaska are being surveyed by a separate group. It is presumed that the recommendations of this group will be considered before a final decision is made concerning the present region I.

PART IV. PROGRAM RECOMMENDATIONS

Health, safety, and coal-mine inspection activities

The Bureau of Mines has contributed very much to the increased safety of mining. It has particularly improved mine safety conditions by its work in safety education, first-aid programs, use of rock dust, ventilation studies, roof bolting, and other programs. It is recognized that the ultimate effectiveness of the safety program is dependent upon the cooperation of Federal and State inspection services, mine employees, and management. It is felt that the recommendations of the survey team would contribute to such cooperation.

Although the Organic Act of the Bureau of Mines and Public Laws 49 and 552 place all of the safety and inspection work of the Federal Government for mining in the Bureau, this type of activity is basically distinct and different from other Bureau functions. This function requires a different type of personnel and a different type of organization than the other functions of the Bureau.

Because the health, safety, and coal-mine inspection functions of the Bureau are so slightly related to other Bureau functions, the survey team has recommended that these functions be organized as a separate functional unit under an Assistant Director reporting directly to the Director (pt. II, p. 6, and chart III).

All research and analytical work for accident prevention, health, and safety should be done in the Bureau's research and analytical facilities by personnel assigned to them, with consultation and advice from the Health and Safety Division. Consolidation of facilities to achieve more efficiency, as, for example, doing all of the work at one station, should not be inhibited by this concept of division of responsibility between the health, safety, and coal-mine inspection organization and the remainder of the Bureau.

The headquarters for health, safety, and inspection work should be in Washington, due to the fact that most of the national organizations representing the miners and the mining companies are in Washington. However, this Washington staff should be quite small. It is needed only for the establishment of general overall policy and availability for Washington contacts. The actual work must be done at the mines. Therefore, the operating personnel and direct supervisors should be located as close to the mining areas as possible. Localized headquarters of supervising personnel should permit more economical operation and a greater awareness of the local mining conditions and safety problems.

The necessary administrative services should be furnished by the administrative staffs in the regions in which the Division's personnel are located. The small group of personnel in Washington should, of course, be served by the Bureau's Washington administrative staff.

Safety education.—It is recognized by industry and by the Bureau that education is the best method to promote safety in mining.

It is recommended (3) that in health, safety, and coal-mine inspection, a major effort be directed to educational work.

To accelerate this activity, a change in the type of personnel may be required. Teaching ability should be sought out among the present peresonnel and be one of the prerequisites in future appointments. Text material and visual aids that depict modern mining practices should be used. Much of the present material is so obsolete that it gives an adverse reaction to the Bureau's educational efforts. Educational activities should be concentrated in those areas in which accident statistics indicate the greatest need.

This educational work can be accelerated without additional funds if the changes are made in inspection activities as provided in recommendation No. 4.

Inspection.—Public Laws 49 and 552 require the Bureau to inspect coal mines. In addition, Public Law 552 gives the Bureau police power in regard to certain specific hazards. Police powers for coal-mine inspection have been exercised by law in practically every coal-producing State for many years. It is recognized that in certain coal-mining areas, where State laws and their enforcement have not been of a high standard, the Federal coal-mine inspection service has materially aided in reducing coal-mine accidents. It should continue to do so until these areas reach the proper safety standards.

It is recommended (4) that the Bureau increase its cooperation with State mine-inspection departments, miners, and operators, to bring all State inspection services up to the general standard of the Bureau's coal-mine inspections.

As this change in State inspection work is accomplished, the need for Federal coal-mine inspection will decrease and eventually cease to exist. Any part of the appropriation not required for inspection should be used for educational work as needed. It appears that this change in activity, which is underway to a small degree, can be accelerated at the present time. This statement is based on the fact that although there are fewer coal mines, fewer coal miners, and less coal production today than at any time since Federal inspection was first required, there are currently more Federal inspectors than at any previous time. Apparently there is a feeling within the Bureau that the present staff of inspectors should be held intact in spite of fewer coal mines and miners, and that more inspections should be made per year. Unless the need for increased inspections can be clearly demonstrated, it is poor business and unfair to taxpayers to follow such a policy.

It is also believed that the inspection work can be more efficient. This opinion is based on the fact that on numerous occasions 2 veteran inspectors have made joint inspections of mines, and that the Washington office, on being notified of excess inspectors in the field, took no action for at least 2 months.

It is recommended (5) that inspectors notify operators and mine safety committees the day before an inspection is started in order that arrangements can be made to facilitate the inspection.

This procedure would save the time of the inspectors, the mine safety committee, and the mine management. When an inspector arrives unannounced, after a shift starts, time is wasted in getting together the proper people for the inspection.

It is recommended (6) that changes in interpretation of the safety code by the Bureau be made available to the miners and management before being put into effect.

It is recommended (7) that the reasons and the need for increasing the minimum number of inspections to three per year for all title II mines be determined.

Three inspections per year of all title II mines could be unduly expensive. No doubt some mines presently require more inspections than heretofore, but it seems obvious that such is not the case in all coal mines. Public Law 552 requires at least 1 inspection of title II mines annually. There is no legal limit on the number of inspections that can be made. The judgment of the Bureau and appropriations of the Congress are the limiting factors in this respect. It is the opinion of the survey team that the Bureau, rather than setting up a minimum number of inspections annually for all mines, would make greater gains in safety by using the available inspectors for an increased number of inspections at mines having the greatest number, and the most serious, substandard conditions. In other words, the frequency of inspections of any coal mine should be related to the safety conditions of that mine. Such a change in its inspection policy, the survey team believes, would be of great help to the Bureau in controlling hazardous conditions over which it has legal responsibility.

It is recommended (8) that the present method of qualifying inspectors be revised to include a written examination on mining and safety practices and methods.

It is recommended (9) that the present form of inspector's report be revised so that time is not wasted on repetition of narrative details and be confined to pertinent facts of the inspection.

This would also eliminate considerable clerical work on the part of the inspectors and other employees of the Bureau.

Minerals activities

The mining divisions in the field are at present devoting their time principally to field work in connection with examinations assigned to them by the Atomic Energy Commission and Defense Minerals Exploration Administration. This particular type of activity has been gradually on the decline, but this trend may be reversed as a result of recent Government action. As soon as possible, however, the backlog of papers and publications dealing with mine development that are of current interest and significance should be pressed to completion.

The work of the mining divisions, other than for Defense Minerals Exploration Administration and Atomic Energy Commission, is principally confined to deposits brought to their attention by small operators and prospectors and to exploration activities inspired by specific national security considerations. This is appropriate, inasmuch as practically all of the larger mining concerns maintain widespread exploration departments in the field. The survey team was advised of 2 prospective Bureau projects, 1 in connection with the White Pine mining operations in Michigan, and another with the San Manuel operation in Arizona.

Although both relate to the work of larger companies, national security considerations are significant.

It is recommended (10) that the Bureau Officials in Washington concerned with programing the work of the mining divisions in the field be alert to any decline of Defense Minerals Exploration Administration and Atomic Energy Commission activities, with a view to the adoption of an appropriate long-range program which would indicate clearly to all concerned their general mission.

The metallurgical divisions in the field appear to be devoting a large portion of their efforts, and rightfully so, to the field of rare and strategic metals and those in short supply for the security and defense of the country. Research is conducted on titanium at Boulder City, Nev.; and on zirconium, hafnium, and other rare metals at Albany, Oreg. Research in manganese, carried out both on the beneficiation of ores and the extraction of manganese from slags, is an important and most necessary part of the mineral program.

Research work on the base metals—copper, lead, and zinc—appears to be a minor portion of the work of the metallurgical divisions. The major producing companies are generally equipped and capable of carrying on regularly and currently work in this connection. A substantial part of the Bureau equipment for this type of research appears to be idle and held on a standby basis.

It is recommended (11) that increased attention be given by regional directors to maintaining proper coordination between the mining and metallurgical divisions in order that any particular project pursued by one division with negative results in its particular field will not be initiated or pursued wthin the field of the other.

In several instances it was found that the metallurgical division was pursuing work on ores that the mining division had already determined to be in insufficient quantity for commercial use. Examples of the converse were also found.

It is recommended (12) that research work on a particular ore or metal be confined insofar as possible to a single station to avoid unnecessary duplication.

It is recommended (13) that the maintenance and operation of the large ore-dressing pilot plant at Boulder City be discontinued.

The scale of metallurgical pilot plant research conducted at, for example, Salt Lake City and Tuscaloosa, should be adequate for all such Bureau work.

It is recommended (14) that the Bureau should not engage in production activities, and should do everything possible to terminate present production activities.

The production activities of the Bureau have been inaugurated by request of Government agencies concerned with military security such as the Department of Defense and the Atomic Energy Commission. In these cases, the Bureau was selected as a production agency because of original research work done in the development of processes. At the present time the Bureau is commercially producing helium, titanium, and zirconium.

The Federal Government, through the Bureau, is the sole producer of helium.[2] The plants at Amarillo and Exell, Tex.; Shiprock, N. Mex.; and Otis, Kans., extract helium from natural gas. In the event any private businesses should desire to enter into helium production, the Government's helium plants should be sold or transferred on some mutually satisfactory contractual basis to such organizations and the Bureau discontinue the production of helium. The survey team believes that private industry would be interested in the purchase of these plants or in operating them on some proper basis if they were made available. The plants should be made available for purchase or operation by industry. Any arrangements in this regard should protect and satisfy fully the military requirements of the Nation. If additional research work on helium is deemed necessary by the Government, the Bureau should conduct such a research program as is necessary. Should the operating organizations desire additional research, if not done by the operating organizations themselves, it should be done under a cooperative agreement with the producing organizations contributing.

The Bureau is producing titanium on a commercial scale at Boulder City, Nev. Present defense projected requirements are of such a magnitude that it will be some time before private industry can meet the tonnage requirements. The Bureau should discontinue commercial titanium production as soon as possible, consistent with national security.

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[2] Helium production is discussed here because of its similarity, as a policy matter, to the production of titanium and zirconium.

The situation with regard to zirconium is analogous to that of titanium. The plant at Albany, Oreg., is producing zirconium primarily for the Atomic Energy Commission. The physical specifications of this metal are at the present time best met by the Bureau plant at Albany. When private industry can supply sufficient tonnage of satisfactory quality, Bureau production of zirconium should be discontinued.

The value of the Bureau's mineral statistics to industry is very great. The Bureau's service to industry in this regard should be continued and strengthened as provided in this report.

Solid fuels and explosives activities

The importance of scientific and technical research to the solid fuels industries—anthracite, bituminous, and lignite—is very great indeed. The Bureau is performing a significant proportion of the research that is underway. Its chemical engineering work in this area appears to be headed in a fruitful direction, as also is its work on, for example, improved mining techniques in the anthracite mines. Other efforts in this area, however, generally seem to be following paths that have been gone over for a very long time by industry as well as by the Bureau.

It is recommended (15) that the Bureau should reexamine its research efforts in the solid-fuels area, redirect them to the greatest possible extent along unexplored lines having long-run significance, and avoid those types of research which industry is undertaking or can readily undertake itself.

It is recommended (16) that a thorough review of the routine testing of commercial explosives be undertaken and that this testing be promptly terminated (except with regard to applications for permissibility of new explosives) if it is not really important as a means of maintaining the permissibility of explosives being used by industry.

The usefulness of the routine tests of commercial explosives conducted at Bruceton is questioned by the survey team.

The analysis of coal samples for Government solid-fuels requirements has had a long history of satisfactory performance and has without doubt resulted in savings for the Government in its fuel purchases and in the upkeep and preservation of its coal-burning equipment. The Bureau also provides a similar service in the analysis of boiler waters and recommendations for their treatment. Periodic reviews of the cost of these services have been made, and should continue to be made, so that the Bureau will recover total costs including depreciation incurred in performance of the work.

The statistical work of the Bureau with regard to solid fuels is a function that is of major value to the coal industry. This statistical function should be strengthened in order that it will be more helpful to both Government and industry.

Petroleum and natural-gas activities[2]

The activities of the Bureau in petroleum and natural gas have for many years supplied technologists and ideas to the industry. These men have played an important role in the security of the country, and the results of the ideas furnished have been valuable.

The Nation in the past has had petroleum available in required amounts from its reserves and production. In times of war, rationing has enabled the Nation to convert its distribution system quickly from a peacetime basis to a wartime basis without having to maintain, in standby, additional productive capacity or a stockpile of oil, either or both of which would place a burden on our economic system.

In recent years, the research program of the Bureau in the field of petroleum production has not been expanded. As a matter of fact, other programs for augmenting oil reserves with production of Government-subsidized synthetic liquid fuel have been initiated and expanded on the premise that the country was running out of oil, while research in improving recovery of known reserves of oil was neglected.

The technical personnel conducting research in petroleum and natural gas have a high professional reputation in the opinion of those in industry conducting research in improving recoveries and in conservation of oil and gas. Strengthening of liaison with industry would assist the Bureau in its determination on

[2] Helium production, as a policy problem, is discussed under Minerals Activities, p. 20.

progress of most merit. Effort should be made by the Bureau to increase the number of cooperative agreements with the American Petroleum Institute and with other organizations. Technologists of the Bureau should attend the Interstate Oil Compact Commission and other industry meetings at which technical programs are discussed, so as to be informed of the progress made.

The petroleum and natural-gas work of the Bureau should regain a position of leadership in the field of research and thus play a more important part in solving the problem of future liquid-fuel supplies from any source.

The survey team feels that it is logical to concentrate the technical research personnel into geographic areas in which the greatest production and prospective production lies. Close contact between the Bureau technologists and those of other organizations with resultant mutual gain would be possible by such a move.

The importance of research in all regions is recognized, but care should be taken that duplication is not practiced. Many oil and gas problems are peculiar to local areas, and research should be limited to these problems in such areas.

In addition to the research work, the statistical work of the Bureau with regard to oil and gas is a very important part of its contribution to industry. In any reallocation or reduction of funds, or in changes in the organizational setup, nothing should be done to curtail this part of the Bureau's activities. The recommendations of the survey team are intended to improve the availability of statistical information to industry.

Synthetic Liquid-Fuels Activities

The need for synthetic fuels has been debated for many years. The use of tax money to develop an industry competitive with an already established industry has been questioned. The need for an additional source of liquid and gaseous fuels has been supported on the one hand by those who fear depletion of domestic petroleum reserves and the cutting off of the foreign supply of petroleum. On the other hand, it is pointed out that the development of a healthy domestic petroleum industry is the best method of conservation. The survey team does not take the position that no research in the field of synthetic fuels is necessary, but it does take the position that large demonstration plants operated by the Bureau are not necessary.

It is recommended (17) that the experimental work done solely by the Bureau on the production of oil shale and oil from shale at Rifle, Colo., should cease, and that no further work be done with the new retort unless there is a substantial contribution by industry under a cooperative agreement.

If industry feels that no further experimental work is necessary, then the facilities will have served the purpose for which they were developed and constructed, and disposition should be made in accordance with established procedures.

It is recommended (18) that the research work on synthetic gaseous and liquid fuels from coal and lignite be confined to small-scale activity and not expanded and developed into large pilot and demonstration plants.

Research work on synthetic conversion of solid fuels to liquid and gaseous fuels is now being done at Morgantown, W. Va., and Bruceton, Pa. A careful examination of the synthetic work being done and the facilities available for it should be made, with the view of consolidating the work. Such consolidation of activity as is advisable and possible should expedite the research work and also make it more economical.

Mineral industries activities

It is recommended (19) that there be unified direction of data collection, analysis, and policy appraisal for minerals and fuels; more timely publication of statistical data; and reduction of cost to a minimum for collection and processing of statistics.

Over a million dollars a year is spent by the Bureau on data collection, analysis, and provision of expert and policy appraisal and advice. There is a need for at least three management improvements:

(*a*) The work needs to be unified, and placed under the direction of a person with broad knowledge concerning the policy appraisal, analytical, and data collection work with which he must deal. It is believed that only in this way can the Bureau become fully responsive to the needs of both industry and Government.

(*b*) The Minerals Yearbook and other publications containing statistical data should be produced on a much shorter time schedule if full value is to be

obtained from this expenditure. There is considerable criticism within the Bureau, industry, and other parts of the Government concerning the long lapses in time between the collection of data and their publication. This delay is due to inability to adapt present statistical processing methods to large variations in workloads throughout the year. It is also due to the extreme decentralization of statistical processing activities within the Washington staff which prevents maximum utilization of the clerical staff under the supervision of experts in clerical processing. In addition, such decentralization prevents functional specialization that could be achieved in clerical pool operations and use of machine techniques consistent with cost considerations.

(*c*) Cost reduction, particularly of statistical processing, should be an important consideration in the management of statistical work.

Careful studies of the cost of, and time required for, alternative methods of conducting statistical operations should be the basic consideration in management decisions as to the method employed. This was not done by the American Statistical Association in its report for the Bureau.

International activities

The Bureau's functions in connection with areas outside the United States, and the organizational units performing these functions, were found to be: (*a*) analysis of minerals and fuels production, consumption, trade, and the like by commodity (Minerals Division and Fuels and Explosives Division); (*b*) economic analysis of international trade, foreign taxation, and the like (Office of the Chief Economist); (*c*) general analysis of minerals and fuels industries abroad, by geographic areas (region IX); (*d*) arrangements and support of technical assistance missions abroad (region IX); (*e*) arrangement and conduct of consultations and other missions abroad (region IX, Minerals Division and Fuels and Explosives Division); and (*f*) appraisal of proposed international mineral policies and rendition of policy advice (region IX, Minerals Division, Fuels and Explosives Division, and Office of the Chief Economist).

The survey team believes that these functions, except those in connection with foreign technical assistance and consultation, can be performed within the Mineral Industries Division, as provided in recommendation No. 1 and discussed on page 8. Moreover, it is believed that arrangements for the assignment of personnel abroad, and coordination of technical support, as is required, can be performed within the immediate staff of the Director as provided in recommendation No. 1 and discussed on page 6.

PART V. GENERAL RECOMMENDATIONS

Administrative activities

The Administrative Division in the Washington office consists of the office of the Chief of the Division (10 employees) and the following 5 branches:

	Employees
Property management	22
Personnel	16
Budget and Finance	30
Office Services	34
Statistical Services (College Park, Md.)	123

Reporting directly to the Chief of the Administrative Division, is also a Records Management Office, a Safety Engineer, and a Central Reports Control Office. The Chief of the Administrative Division reports directly to the Director.

This general form of organization prevails in the eight geographical regional offices to carry out the administrative functions within each region. In varying degrees, field offices, laboratories, pilot plants, and stations maintain administrative personnel who report to the official in charge of the installation.

The survey team, in its interviews with field personnel, found general satisfaction with the present decentralization of administrative work as it relates to the day-to-day operations in the field.

The survey team believes that there are two major criticisms of administrative work in the Bureau: (*a*) insufficient delegation of authority, necessitating Washington office approval in matters which should be settled in the field and thus avoid considerable delay; and (*b*) the tendency of some administrative personnel at field offices to overstep their authority to the point of unduly complicating the activities of the responsible operating officials, rather than providing service.

In the explanation of its concept of the Administrative Division within its recommended organization of the Bureau (part II), the survey team has indicated the need for increased emphasis upon administrative operations in the four recommended regional headquarters and decreased emphasis upon such operations in Washington and field stations. This distribution of work should bring about a net overall reduction in the number of administrative personnel despite the increasing emphasis that is put upon administrative work generally in the Federal Government and the increased distance of field stations from regional headquarters.

To conduct administrative matters in the manner believed desirable by the survey team, very capable staff personnel in the administrative area are essential in the Washington headquarters office. Moreover, well-qualified administrative officers are required in each of the regional offices. The reduction in the number of regions should make it possible to staff the regional offices with the required level of administrative help. There appear to be available within the Bureau, personnel of the required high caliber.

The survey team believes that there has been too great a tendency to burden the Technical Division and branch chiefs in the field with administrative work, when these people should properly devote their time to their professional endeavors. The administrative work should be handled by persons trained in that field and every effort should be made to find practicable procedures and methods for relieving technical people of this work. This objective is emphasized because division and branch chiefs at the present time find their principal difficulties to be administrative rather than in the direction of research. There does not appear to be the initiative at present, either from the Washington office or within the regions, necessary to find means of relieving operating officials of their administrative problems.

It is recommended (20) that the administrative staffs in regional offices should be strengthened by placement, with emphasis upon reassignment, of persons with broad capabilities and qualifications in administrative management.

Delegations of authority to regional offices for position classification, appointment of personnel, contract approval, and purchasing authority, have been limited because those offices are not adequately staffed in grade classification to handle these responsibilities. The reduction of regions from 9 to 4, and the placement of higher quality administrative personnel in higher grade classifications should enable the maximum amount of delegations of authority to regional offices for administrative matters. This in turn should permit a substantial reduction in the Administrative Division in Washington.

It is recommended (21) that the Washington staff of the Administrative Division (except the proposed Administrative Branch—Washington) confine its activities to giving advice and guidance to the Director.[4]

It is recommended (22) that the present program of disposal of excess property be vigorously pursued, with deadlines established for its accomplishment.

The survey team observed in many offices and stations of the Bureau large amounts of obsolete or unused equipment and supplies for which the operating official had no plan for utilization. Utilization of property should be completely justified or declared surplus through established channels. The Bureau should make some provision whereby those persons responsible for property management make periodic visits to industrial firms and other Government agencies within their immediate areas to familiarize themselves with the most recent and up-to-date methods of warehousing, stock control, inventorying and purchasing.

It is recommended (23) that the inventory of automotive equipment be substantially reduced; that the Bureau establish use requirements for motor vehicles; and that the Bureau investigate the practicability of renting vehicles from commercial firms to meet peak requirements.

The number of motor vehicles in the field is in excess of the actual needs of the Bureau. Many vehicles are in storage in anticipation of their use during the summer months. The implementation of this recommendation will make for more efficient handling of automotive equipment and should reduce considerably the cost of this type of facilitating service. The new policy of paying employees for the use of private cars in the conduct of official business should be implemented to the extent that it is the least-cost method of securing required official transportation.

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[4] See p. 9 for discussion of this matter.

It is recommended (24) that the Bureau, through its regional offices, take steps toward solving the shortage of technical personnel by the establishment of college trainee positions, and the formation of recruiting programs for each region.

Without exception, every operating official interviewed in the field stated as one of his major problems that of recruiting qualified technical assistants. A program for utilizing college students during the summer months, with the objective of permanent placement upon graduation, has not been utilized to any great extent by the Bureau. In the same manner, the Bureau has not made a coordinated and forceful attempt to recruit graduating college seniors. Recruiting has been left almost entirely to individual staff members of the Bureau or supervisory personnel who are in particular need of employees. Effective recruiting in colleges and universities must be well organized and well planned. A good deal can be done to attract college graduates to the Bureau by bringing to the college campus an effective recruiting program. This is done by large business organizations in the same types of activity.

It is recommended (25) that the Bureau carry on a supervisory training program in executive development and management.

With the emphasis placed upon technical competence, and properly so, in the selection of regional division and branch chiefs, successful carrying out of supervisory and management responsibilities requires this supplemental training. A major objective of this training is to create an understanding among supervisory employees of their management responsibilities and of effective means of utilizing the staffs made available to them.

Program and project system

The Bureau has made strenuous efforts in recent years to develop research programs by commodities on the basis of analysis of their importance. It has also developed a system for initiation, review, final authorization (allotments of funds), and appraisal of results of the projects which are to implement the commodity programs. In addition to these efforts, the Bureau has developed, in cooperation with the Office of the Secretary and the General Accounting Office, a new cost accounting system, and is now in the process of putting it into effect. The Bureau is developing a manual of instructions and authorized procedures for the guidance of all personnel.

The survey team believes very strongly that all these efforts are in the right direction. It believes that the following comments and recommendations are of value in the further development and refinement of these procedures.

It is recommended (26) that the term "project" be used only in connection with Bureau activities where definite scientific, technical, or analytical research objectives are to be obtained by the work performed in some presumed period of time, and not in conection with continuing analytical, testing, production, administrative, and service functions.

Unless this definition of a project is kept clearly in mind, the project system would represent no real change over the previous system of allotment of funds by organizational units.

It is recommended (27) that projects be large enough to facilitate efficient administration.

Action designed to enable the field management to increase efficiency and effectiveness in utilization of personnel and equipment, and reduce accounting costs under the new accounting system, should be taken along this line. Liberalizing the present authority of the regional director to transfer funds to the extent of plus or minus 15 percent should not be undertaken. Liberalization of this rule could easily defeat the purpose of the program and project system.

It is recommended (28) that in the interests of economical conduct of research that no project be authorized, or its authorization continued, unless sufficient funds can be allocated to conduct the project at an economical and efficient rate.

The present project system provides for a statement as to the minimum expenditure rate which should be provided for the project, otherwise it should not be undertaken or continued. Apparently these statements are not always taken into account as they should be.

It is recommended (29) that cost-accounting records be maintained on a project basis in order that total costs (excluding clearly defined nonallocable costs) for each project can be readily and routinely available to the management of the Bureau.

Maintenance of cost-accounting records on a station, program, region or some other basis, apparently would take less accounting, but it would be impossible

to ascertain the cost of achieving or not achieving each research objective. The survey team believes that it is important that the person in charge of the project, as well as those involved in management, possess this project cost information. As long as the project is the basic unit of authorization and control of research activities, cost accounting by projects is essential.

It is recommended (30) that the Director utilize more fully the regional directors and their key staff in the preparation of the budget and in the allocation of funds after appropriation by the Congress.

In the past, the Bureau has not consistently called upon the regional directors for consultation in the preparation of the budget or at the time the appropriation has been approved by the Congress. The team realizes that the budget process is often handicapped by time requirements. However, in order to provide for an effective program, it appears essential that the regional directors participate to a much greater extent than has been true in the past in budget preparation and final allocation of funds. An annual programing conference should be held between the Director, key staff members, and the regional directors, if possible, when the final allocation of funds for the current fiscal year is made, and the budget for the following fiscal year is in preparation.

It is recommended (31) that the status of programs and projects be shown annually in a report which also forecasts the planned duration of each project and expenditure rate for the full period.

It is recognized that substantial changes will be made from year to year in the decisions reflected in this report. Nevertheless, it is believed that this document would be of substantial use within the Bureau and would assist greatly research advisory committees to the Bureau, the Office of the Secretary, the Bureau of the Budget, and the Congress in their review of Bureau research activities.

It is recommended (32) that pioneer projects which were found operating in a few regional research divisions, be more widely approved for the purpose of enabling the development of worthwhile research project proposals.

A pioneer project is a general authorization for a limited amount of money to bear the cost of generating new project proposals. The whole worth of the Bureau's activities depends upon the usefulness and scientific merit of its research projects, and these projects depend upon the generation of good proposals among the Bureau's scientists and engineers. Time is required to consider the scientific background of research problems and formulate worthwhile project proposals. A recognized way of charging for this time is desirable.

Cooperation with industry and other agencies

Advisory committees.—Consultation with industry and other agencies conducting research on minerals and fuels is essential in connection with the development of Bureau research programs and authorization of projects. This is particularly important in order that duplication can be avoided and that the Bureau's activities are clearly directed into worthwhile research areas that others are unable to cover. The Bureau already maintains informal contact in varying degrees with industry, universities, States, and other research groups. It is desirable that this contact be strengthened and formalized.

It is recommended (33) that advisory committees be established and regularly consulted in connection with the functions of the Bureau, particularly in connection with mine health and safety matters and with respect to minerals, solid fuels, and petroleum and natural gas research.

Cooperation with State governments.—It has been the policy of the Bureau to cooperate with State governments in connection with minerals and fuels activities. The implementation of this policy needs to be pursued further.

It is recommended (34) that increased attention be given to cooperation by the Bureau with mineral and geologic departments of the individual States.

The Bureau and State agencies should work, for example, toward an agreement on the form and method of collecting statistics. This would bring about a saving in collection personnel and a reduction in the workload of industry in furnishing this information.

Cooperation with colleges and universities.—It is recommended (35) that, where possible, the Bureau resume the type of cooperative research which it formerly conducted with universities and colleges.

Certain types of basic and fundamental research can best be carried out by the Bureau in cooperation with colleges and universities to their mutual advantage.

Cooperation with industry.—The ultimate benefit of the Bureau's work is realized through utilization by industry of the results of its research. To achieve this benefit, close cooperation in research activities is necessary and desirable.

This cooperation should increasingly take the form of contributions by industry for the support of Bureau research projects. In the carrying out of this policy, care should be exercised to see that the Bureau avoids competition with private consultants, consulting engineering firms, and commercial chemical and assay laboratories. Gratis service should be confined solely to qualitative mineral identification. Care also should be exercised that Bureau research work is not initiated where the result could accrue only to the benefit of a single company in any industry, unless considerations involving national security dictate otherwise.

Cooperative trust and working funds.—The general policy of obtaining outside funds to assist in the support of research is sound and should be encouraged and extended as a concrete manifestation of cooperation with industry and other agencies. In this way, important research can be furthered and the interest of sponsors created and maintained. In certain instances the industry should be obliged to meet an appropriate share of the expense or the research should not be conducted at all.

It is recommended (36) that the Assistant Secretary for Mineral Resources establish a more definite policy governing cooperative trust and working funds; and such policy should be implemented by the Bureau through necessary regulations, delegations of authority, and procedures for approval.

The survey team found officials in the field who were not cognizant of a clear policy in this regard and of an established procedure to be followed in obtaining cooperation.

Facilitating services

The cost of facilitating services as a charge upon research funds appears to be high at many field stations. To the extent research funds are reduced in total, the proportionate burden upon them of facilitating services is increased, because these services in many instances are not, or cannot be, proportionately reduced. The solution of this problem requires a definite change in policy with regard to these services: from one which emphasizes complete self-sufficiency in provision of services to one where major reliance is placed upon contracting for service as definitely needed.

The policy of self-sufficiency has led to the prevalence of machine shops and woodshops at each station; automobile and truck service and repair facilities; regular full-time employment of painters, garage mechanics, electrical service men, machinists, toolmakers, cabinetmakers, and other such personnel. Underutilization of these facilities and services is inevitable and results in a wasteful drain upon research funds of the Bureau.

Shop equipment, such as oversized lathes, boring mills, drill presses, and hammers, was found which is more appropriate for an industrial manufacturing establishment rather than for a research organization. It is perhaps necessary to maintain shop service for certain precision work, such as special toolmaking, but the present number of shops, and in many instances their size, is unnecessary and wasteful. The survey team observed woodworking shops generally being devoted to the manufacture of cabinets, shelves, tables, and desks; this type of work most certainly should be discontinued.

It is recommended (37) that the general practice of having machine and woodshops as part of the facilities of each station be discontinued; that reliance be placed as much as practicable upon contracting for necessary services in this regard; and that machine shops of appropriate size and equipment be limited to 1, or possibly 2, per region, depending upon need.

It is recommended (38) that all other facilities and services, provided as facilitating services to research projects, be drastically reduced, and much greater reliance placed upon contracting for such services as needed.

Pricing of publications

The survey team was informed that all reports of investigation, information circulars, and other Bureau-reproduced publications are distributed to the public free of charge. A substantial number of copies of Bureau publications printed at the Government Printing Office, such as the Minerals Yearbook, various handbooks, and bulletins, are distributed free of charge by the Bureau and are also sold upon request to the public by the Government Printing Office.

Many of the Bureau's publications are of direct interest and benefit to a relatively narrow segment of the population who generally should be asked to pay an appropriate price. This price would be prohibitive if all the costs of research, as well as publication, were to be covered. The cost of reproduction

and distribution, however, could probably be covered in many instances. Aside from the appropriateness of direct beneficiaries making some contribution to the cost of the Bureau's work, the payment of a price serves to gage the real interest of the public in the Bureau's output of publications. In instances where publications are an incidental cost of Bureau educational activities, or where widespread public interest is desired, free distribution might appropriately be continued.

It is recommended (39) that the general policy of free distribution of the Bureau's output of publications be changed to a general policy of charging an appropriate price, with exceptions to this policy being permitted in carefully considered cases.

This recommendation is in general accord with the views concerning all departmental publications expressed by the survey team on the Department's information program.

THE SECRETARY OF THE INTERIOR,
Washington, November 30, 1953.

Memorandum.
To: Director, Bureau of Mines.
From: Assistant Secretary Wormser.
Subject: Survey of the Bureau of Mines.

There is hereby created a survey team composed of the following members:
Mr. Curtis L. Wilson (consultant), chairman.
J. E. Butler (consultant).
John C. Kinnear (consultant).
Dennis L. McElroy (consultant).
Spencer S. Shannon (consultant).
Henry Caulfield (technical review staff), staff assistant.
Named later: George E. Robinson (Office of the Administrative Assistant Secretary), staff assistant.

The survey team will initiate its study on December 14 and will endeavor to have its report submitted for approval about January 30. This team will investigate the organizational setup and the operating procedures of the Bureau of Mines in Washington, in the regions and in the field offices, and present recommendations for improving the administration of that Bureau. The objectives of the survey are to determine what is being done, whether work is being accomplished in an efficient manner, and whether there are other means of accomplishing the work more effectively. These points should be given careful study:

1. Organizational structure and staffing patterns throughout.
2. Operating policies and procedures, particularly with respect to budget and fiscal control and other staff services.
3. Various functions and responsibilities of region and field offices, including delegations and redelegations of authority.
4. Legislative authority for Bureau programing.
5. Relations with other bureaus in the Department, other Federal agencies and local government.
6. Public relations and informational activities.

The work of the survey team will be coordinated with other surveys which might be underway.

The survey team will also take into consideration any recommendations made in previous reports regarding the Bureau, particularly any recommendations contained in reports by congressional committees.

It would be greatly appreciated if you would arrange to make available to this team, when needed, the services of any Bureau employee for the purpose of compiling information or providing other help.

The team is not authorized to take any action to carry out its recommendations.

FELIX WORMSER, *Assistant Secretary.*

Approved November 30:
DOUGLAS MCKAY, *Secretary.*

Mr. TUDOR. If it meets with your pleasure, sir, I should prefer not to read that statement, but to speak from notes along the same line.

This report is one of a number we have been having made relative to reorganization of various bureaus of the Department. We have some 11 bureaus and other miscellaneous administrations which we resolved we should look at when we came into office. It was not that

we were critical of how they were operating. However, I have found in my business, for example, I should take a look at its administration every so often to find out if it is efficient and doing the best job possible.

We wondered just how to do that. There were at least three possibilities.

First, we could use the administrative machinery within the Department itself to look at the various bureaus.

Second, we could hire a management company to come in and look at the bureaus and tell us what perhaps might be better in the way of administration.

Third, the one we finally adopted, was to retain the services of unusually well qualified and interested citizens around the country to come in and form a team and travel around looking at the bureau, talking with the employees and with people outside who were interested in the functions of the bureau, to give us a recommendation on what, if anything, should be done to reorganization.

In each instance we told this team that it was to look at the responsibilities given that bureau by Congress. The team was to look at the organization; the bureau had to carry out those responsibilities, and it was to recommend any improvements which were thought to be appropriate in that organization.

Each team was specifically told to stay away from philosophies; this was purely management.

The members of the teams, the people we have been able to obtain on these survey teams, have been quite remarkable. I think they are men of stature, whose very stature makes them people we have confidence in.

In this particular team we had Dr. Curtis L. Wilson as the chairman. He is dean of the Missouri School of Mines at Rolla, Mo. He has quite an imposing record. He graduated from Baltimore City College; the Montana School of Mines; Columbia University; the University of Gottingen, Germany. As his record, he was assistant research engineer for Anaconda Copper Co., from 1920 to 1921; professor of metallurgy, Montana School of Mines, 1921 to 1941; dean of the Missouri School of Mines, 1941 to date; and he is a member of the American Institute of Mining and Metallurgical Engineers, the Institute of Metals of London, the American Mining Congress, the Mining and Metallurgical Society of America, the Pan American Institute of Mining Geology, the ASEE, the Montana Society of Engineers, the NSPE, the Missouri Academy of Sciences; and he is chairman of region VI, Committee on Engineering Schools; and is a member of the Missouri State Teachers Association.

Another member was Spencer S. Shannon. I will not go into the details of his record, but it is comparable to that of Dr. Wilson. He was engaged in mining and consulting, from 1920 to 1942. He was vice president and director of the Carbon Coal & Coke Co.; a partner in the Shannon Co., Dudley, Pa.; has done consulting work in mining as owner of the Shannon Co., Bedford, Pa.; is director of the First National Bank of Saxton, Pa.; of the First National Bank of Huntington, Pa.; was Assistant Chief, Metals and Minerals Branch, Board of Economic Warfare, 1942; was Chief in 1943; and held other offices.

50981—54——5

Mr. J. R. Butler was another member. I will not go into the details of his career.

The other members were Dennis Lee McElroy and John C. Kinnear.

All of these men are men of reput in mines and minerals and various corollary operations.

This team made this survey, and it is 1 of 16 we have had. This is one of the last ones, incidentally.

I think we have had all the bureaus surveyed, but there are 2 or 3 other surveys which are still to be made.

This particular team worked 72 working days. They started last December. They spent 7 weeks in the field. They interviewed approximately 150 Bureau employees and 80 representatives of industries, universities, and State governments.

Incidentally, included in those interviews were representatives of the United Mine Workers.

As to the report itself, it pays high tribute to the Bureau of Mines, and I think that tribute is deserved. The Bureau of Mines has maintained a high integrity over the years. It has done a magnificent job in mining safety. It has done a magnificent job in research and development of minerals production. It has also done a very fine job in connection with statistics, which, of course, the industry of the country needs very badly.

The team members pointed out that while they made 39 specific recommendations in the report that should not be taken as a criticism of the Bureau. After all, they were instructed to make recommendations for improvements; so that while they do make these 39 recommendations for changes that does not mean they did not think the Bureau was an excellent one; and they went out of their way to point that out. We concur in that.

The Secretary received this report and by letter of July 1, 1954, he approved of it with certain exceptions. He took exception to one particular recommendation that had to do with forewarning mines of their inspections. We thought that was probably not too good, and wanted to take another look at it before we adopted it.

The Secretary reserved four specific items for the Assistant Secretary to pay particular attention to. Those are matters of policy.

There is one in particular I want to take up, and that is the discontinuance of production activities by the Bureau. On the rest of them he instructed the Bureau to put them into operation within 12 months.

I should like to call your attention to one paragraph of the directive of the Secretary, and, if I may, I will read it:

> If the Director believes, during the course of effectuating the recommendations, as approved, that significant modifications should be made, he shall submit recommendations in such regard to the Assistant Secretary—Mineral Resources—for prior approval by him and by the Under Secretary before taking action. Minor modifications may be accomplished by the Director where, in his opinion, the change does not represent a significant departure from the views of the survey team as indicated in the report.

In other words, there is quite a bit of latitude there if the Director of the Bureau finds that, in his opinion, these recommendations are not good.

The recommendations of the team ranged quite broadly. They ranged from some very important ones to ones of less significance.

For example, there was the reduction of regions of the Bureau of Mines from 9 to 4. And there were some rather substantial recommendations concerning improvement in the mine-safety program. Then there were relatively unimportant ones—they are important; yes; but not so important as those first two—as to the number of Government-owned vehicles and the reduction in the woodworking shops, for example, where it was felt considerable saving could be effected without in any way interfering with good operation of the Bureau.

I should like to discuss several points which I believe the press has recently brought up, and on which some confusion has existed. Particularly, I should like to discuss this matter of mine safety. That was covered generally on page 15 of the report, if you have a copy before you.

I should like to first point out the specific recommendations made by the team.

In the first place they recommended:

> That in health, safety, and coal-mine inspection, a major effort be directed to educational work.

I think it goes without saying, in a safety program of this kind, that the inspectors themselves and the employees and management need education in safety in order to make it properly effective. I know I have been connected with construction work a good many years and fully appreciate and realize the value of safety in that work; but it is ineffective unless the people who are directly concerned with it are well educated in methods and results.

The team, I think very properly, recommended that more effort be put in that direction.

The next recommendation was:

> That the Bureau increase its cooperation with State mine inspection departments, miners, and operators, to bring all State inspection services up to the general standard of the Bureau's coal-mine inspections.

That is one of the recommendations which caused some concern, because one conclusion—and I point out this is a conclusion the team neither made nor the Secretary adopted—was that the team concluded that as this change in State inspection work is accomplished, the need for Federal coal-mine inspection will decrease and eventually cease to exist.

Now, the recommendation was based upon the thought that some of the States do not have as adequate a mine-safety law as they should have, nor do they function as well as they should. Therefore, it was felt proper that the Bureau devote considerable of its effort to bringing up the standards within the States, and we concur with that

As to what may happen if this is done and done adequately relative to Federal mining inspections, that is something for the future.

The team concludes it might result in the Federal Government eventually getting out of this work. Certainly we cannot see that at the present time, and certainly if it ever does come about it will be necessary for there to be a change in the laws of Congress.

I want to make it crystal clear that the Secretary is not recommending at this time that the Department and the Bureaus get out of Federal inspection of mines. We do believe, however, that considerable can be done with some of the States in bringing up standards.

The third recommendation was:

That inspectors notify operators and mine safety committees the day before an inspection is started in order that arrangements can be made to facilitate the inspection.

We doubt the propriety of that. We think it may really set the stage for the inspector. Therefore we reserve judgment on it, and the Secretary specifically reserved judgment on that one.

The team further recommended:

That changes in interpretation of the Safety Code by the Bureau be made available to the miners and management before being put into effect.

We found that sometimes if an interpretation is put out too fast we might be wrong. Furthermore, the miners and the management may have some difficulty in putting it into effect right away. It is much better that these interpretations be discussed in advance. We have been practicing that.

The team further recommended:

That the reasons and the need for increasing the minimum number of inspections to three per year for all title II mines be determined.

In general, as is brought out in this report, the team found it would be much better to concentrate inspection on the mines which do not have a good record, rather than to have an arbitrary rule that every mine be inspected three times per year. I think the law says a minimum of one time per year.

They also recommended:

That the present method of qualifying inspectors be revised to include a written examination on mining and safety practices and methods.

That was to improve the caliber of the inspectors.

Finally, they recommended:

That the present form of inspector's report be revised so that time is not wasted on repetition of narrative details and be confined to pertinent facts of the inspection.

That is a relatively small matter concerning administration which I think is obvious on its face.

Now, another question came up, and that is relative to helium, titanium and zirconium. That came up by virtue of a recommendation of the team—

That the Bureau should not engage in production activities, and should do everything possible to terminate present production activities.

That was the recommendation of the team which was adopted by the Secretary. I point out in that recommendation there is no mention of helium, titanium, or zirconium. That is in the discussion stage.

As to those three items, the team put this in this report:

In the event any private businesses should desire to enter into helium production, the Government's helium plants should be sold or transferred on some mutually satisfactory contractual basis to such organizations and the Bureau discontinue the production of helium.

In the first place, nobody is more aware of the fact than the Department that anything along that line would, of course, require congressional action. The law is quite specific on how the helium plants will be operated and maintained. No peremptory action by the Department certainly would be undertaken.

Mr. ASPINALL. May I interrupt at this point, Mr. Chairman?

Mr. Tudor, is it not true that the House passed a bill within the last 10 days which made possible the transfer of at least some of the helium properties to private industry?

Mr. TUDOR. I am not aware of it, if they have, sir.

Mr. ASPINALL. That bill was put through the House without any consideration.

Mr. TUDOR. I am not aware of any such legislation, sir.

Mr. ASPINALL. The bill came out of the Committee on Government Operations. It did not come through this committee whatsoever. Am I not right?

Mr. D'EWART. I do not know. What is the number of the bill? Let us have the staff get a copy.

Mr. TUDOR. I know we have sought further appropriations for expanding our helium facilities, because there is not enough helium production now to meet needs. We have made an investigation, some little time ago, as to the possibility of doing something of that kind. Our investigations to date have indicated that it is not likely to be appropriate.

We doubt if there is anybody interested in it, because the market circumstances for the sale of helium are such that private industry probably could not take the risk.

Mr. ASPINALL. There is another matter involved in this, too, Mr. Tudor. The supply of helium throughout the world is rather scarce; is that not right?

Mr. TUDOR. That is correct, sir. We are the only producers.

Mr. ASPINALL. We are the only producers. Helium is a very strategic material?

Mr. TUDOR. That is right.

Mr. ASPINALL. In case of international conflict would that not be very important?

Mr. TUDOR. That is correct, sir.

Mr. ASPINALL. The handling of helium by business enterprise should always be very closely examined—at least, that is my thinking.

Mr. TUDOR. That is our thinking, too, sir.

Mr. ASPINALL. Private intiative all too often forgets the security of the Nation and deals in international trade. Unless the Government of the United States continues a very close control over the sale of helium it is not unlikely it would be handled just like any other scarce material, and business might enter into transactions with foreign countries, and the first thing we knew perhaps even our enemies in present-day relations throughout the world would be able to get a supply of helium. Those are the matters about which many of the people are wondering.

Mr. TUDOR. Mr. Aspinall, that is extremely important. I think this team recognized that, because they said:

> Any arrangements in this regard should protect and satisfy fully the military requirements of the Nation.

Certainly our Department, if this were given serious consideration—and at the moment it is not—would be very conscious of national security and the problems related thereto. This would have to be completely discussed with the Department of Defense, the Atomic

Energy Commission, and certainly, of course, with Congress, before any action along this line would be taken.

I presume—and I cannot say from knowledge—that the team had in mind, when it made this recommendation, that the operator of the plant, if it were undertaken by those other than the Federal Government, would have to be very closely controlled and probably the sales would be completely at the approval of the Federal Government.

Mr. ASPINALL. Would you care to advise me what are the uses of helium gas?

Mr. TUDOR. I do not know all of them. I of course know it is used for lighter-than-air craft, but beyond that I am not familiar with its use, sir.

Mr. ASPINALL. If it is used only for lighter-than-air craft——

Mr. TUDOR. It is used for welding. I know that.

Mr. ASPINALL. It is used for some welding?

Mr. TUDOR. Yes, sir. It has industrial application, important industrial application.

Mr. ASPINALL. Do you know whether or not it could be so controlled that only limited amounts could be allowed to go into foreign countries for such uses as welding and the like?

Mr. TUDOR. Well, it is controlled now.

Mr. ASPINALL. I know it is controlled now.

Mr. TUDOR. We would have to maintain a comparable control.

Mr. ASPINALL. It is controlled now because the Federal Government has an absolute monopoly over the production.

Mr. TUDOR. That is correct. Without arguing the propriety of doing it, I can understand where private enterprise might operate the plant and sell its entire production to the Federal Government for disposal, but certainly the product would have to be very completely controlled.

I should like to point out that we do not have any present indication that we are going to recommend to anybody that the helium plant be turned over to private industry, either for just operation or for ownership.

Mr. MILLER. Will the gentleman yield?

Mr. ASPINALL. Certainly.

Mr. MILLER. Will that require legislative action?

Mr. TUDOR. We understand it will require legislative action, because Congress has passed laws on this specific subject, sir.

Mr. MILLER. As I look over a number of the recommendations in the memorandum of the Bureau of Mines, I am under the impression there were quite a few of these recommendations which would require some legislative action. Do you know which ones of the recommendations would require legislative action?

Mr. TUDOR. No, sir. I would have to go through them and pick out the particular ones. Even the particular recommendation as to helium, I believe, sir, for instance, would require legislative authority, in order to take the move suggested here. As to the matter of titanium, I do not think we would require that. I will explain that in a minute.

Mr. MILLER. Have you examined the shale oil section, as to whether that might require legislative action?

Mr. TUDOR. We are operating under legislative action now. If you interpret what the team recommends in one sense it would certainly

require legislative action. If you interpret it in another sense, as we did, it would not. I will go into that, sir.

Mr. MILLER. Would you mind yielding again?

Mr. ASPINALL. I will yield.

Mr. MILLER. Would you mind telling the committee what work private industrial corporations are doing with the mountains of shale we have? I am thinking now of Rifle, Colo. I have looked at that plant on 2 or 3 occasions. I believe the last time I was there they were sending some of that material down to Louisiana to some universities, with the idea that there might be a new way of extracting the oil from the shale. Have they proceeded with those experiments?

Mr. TUDOR. I am not aware of that, but I think Dr. Forbes, who is here, can give you the details.

Mr. MILLER. Mr. Chairman, could Mr. Forbes come up here at the table with Mr. Tudor?

Mr. ASPINALL. If my chairman will let me have my time back for just a minute, then I will yield again.

Mr. MILLER. Certainly.

Mr. ASPINALL. Of course, we do not want to be too naive about this, because there is legislative action which is necessary. All we have to do is impose the congressional will, whatever it may be, on the Appropriations Committee, and cut out the appropriations, and we will have a dead plant there, and sooner or later it will be in such a condition that only private industry could have any particular interest in it, and then it will be declared surplus and will be sold to private industry, and the Government's investment will then be gone, with no chance of return.

Mr. MILLER. As I remember it, at Rifle, Colo., there was not very much investment outside of the question of who owned the shale.

Mr. ASPINALL. My goodness, Doctor! There are millions of dollars invested in the plant at the present time.

Mr. MILLER. They are burning or cooking that shale and getting oil out of it. I thought it should be continued. I wonder if Mr. Forbes or somebody can tell us what progress, if any, has been made in the process of getting oil out of shale? Is it economically sound? Is there anything new to report at this time?

Mr. FORBES. I am going to ask Mr. Perry, who is here, the Acting Chief of that Division, to answer that.

Mr. MILLER. Will you give your full name, please?

Mr. PERRY. My name is Harry Perry. I am Acting Chief, Fuels and Explosives Division of the Bureau of Mines.

We have continued to cooperate with both industry and universities in the new methods of retorting and refining oil shale. We have somewhere between 100 and 150 cooperative agreements with various people who have an interest.

Mr. MILLER. How many agreements?

Mr. PERRY. Between 100 and 150 agreements, whereby the Bureau supplies either oil shale or shale oil to the people who are interested. In return we obtain the results of their experiments for evaluation.

Mr. MILLER. Will you tell the committee who some of the people are who are cooperating in that program now?

Mr. PERRY. Yes, sir. I can give you some of the names. There are a good many of the oil companies involved. For example, the Union

Oil Co. has been working on the process concurrently with the Bureau. They have developed processes for retorting shale at about the same time we have.

There were other oil companies to whom we supply these materials. This is one of the few places where it is possible to obtain oil shale, because we have the mine.

In addition to that we have cooperative agreements with many equipment manufacturers, because this is a new material which has to be handled. We have to learn what it will do with various pieces of equipment.

We have cooperative agreements with a considerable number of people interested in drilling and in mine bits. One of the large costs of obtaining oil shale is in the mining operation. The Bureau has run what we consider to be a rather satisfactory mining method. We have reduced the cost to about 50 cents a ton for mining.

In this work we cooperated with all people who would have an interest in assisting us in reducing this cost. We are still continuing that kind of cooperation.

Mr. MILLER. What is the use of the oil which comes from that shale at the present time? It seems to me that 3 years ago they said they thought they could make a tractor fuel out of it. They were not able to make at that time a fuel to be used in the automobiles. What is the situation now?

Mr. PERRY. We can produce fuel which is usable for both diesel and gasoline and other types from the oil shale.

Mr. MILLER. In competition with the present methods?

Mr. PERRY. That is a more difficult question to answer, sir. We made a study of that about 2 years ago, and we had the National Petroleum Council, which is the advisory group to the Secretary of Interior, make a similar study. They agreed reasonably well. While the costs were not exactly comparable at the present time it appeared we were getting reasonably close, and similar kinds of improvements to the kinds we had already made might bring that down to the place where it would be competitive. The exact time that would happen would depend upon the technology and the economic price of the material.

Mr. MILLER. What about the fuel oil or lower grades of oil? Can that be produced from shale at competitive prices under present conditions?

Mr. PERRY. It depends, sir, on what prices you assign to the more expensive products. The interrelationship here is just as complicated as it is for petroleum. If you get a barrel of crude petroleum, the value of the residual oil depends upon what you can get for the other things. These things are very complexly interrelated. I do not believe I can answer directly.

Mr. MILLER. How large an area around Rifle, Colo., is covered with this shale which can produce this oil?

Mr. PERRY. It runs from around Rifle to the northwest and into Utah, sir, and a little bit into Wyoming.

Mr. MILLER. How large an area in square miles would that be?

Mr. PERRY. I do not think I can answer that. I can answer the question which I think you are getting at. There is at least 100 billion barrels of oil in that shale.

Mr. MILLER. 100 billion barrels of oil?

Mr. PERRY. Yes, sir.

Mr. MILLER. In the shale area?

Mr. PERRY. Yes, sir.

Mr. MILLER. It is estimated at 100 billion barrels of oil?

Mr. PERRY. Yes, sir.

Mr. MILLER. Do you know what the potential might be of oil from other sources?

Mr. PERRY. The known reserves at the moment—they are being discovered every day, so it is a difficult question to answer—at this very moment run about 30 billion barrels.

Mr. MILLER. 30 billion barrels of known reserve?

Mr. PERRY. Yes, sir. Every year we have discovered more than we have consumed.

Mr. MILLER. I hope I am not taking too much time. I do want to come back now to the other question.

The Government has a monopoly at the present time of extracting and experimenting with getting oil out of this 100-billion-barrel reserve of oil; is that right? The Government is the only one producing it now, or is it being done by anyone on a commercial basis?

Mr. PERRY. Well, we are not doing it on a commercial basis. No one else is. However, there is a considerable amount of experimentation being conducted by oil companies, especially those which have leases on the lands.

Mr. MILLER. Do you know of any oil companies which would like to proceed with the leases they have on the land to produce this for commercial use?

Mr. PERRY. No, sir; but I think there are quite a few of them who would be interested in cooperating with us to further explore this possibility of the technologic side of it.

Mr. MILLER. If the Government is expected to sell its interest or its investment, do you know of any oil companies, private groups or corporations, which would want to step in to carry on the work which is presently in progress?

Mr. PERRY. I think there are a considerable number of them who wish to cooperate with us. That other matter has not been explored, to the best of my knowledge.

Mr. MILLER. 100 billion barrels of oil should be enough to go around for several companies to work upon.

Mr. REGAN. Would you yield there, Doctor?

Mr. MILLER. Yes.

Mr. REGAN. It is my understanding all the major oil companies who have refining and marketing facilities are interested, but thus far they have not been able to extract this oil at a price which would compete with the flowing or pumping wells. Until the price of oil is higher than it is today, neither the Government nor private industry can extract the oil commercially. I think they are all engaged more or less in research work against the time, which may ultimately arrive, when we do not have flowing or pumping wells and we will have to get our oil from that shale; is that not right?

Mr. PERRY. Yes, sir. The Bureau of Mines is interested in this from two standpoints, sir, although they are both related to experimentation. We are not interested and have never been interested in

doing anything on a commercial scale. We think this is a vast and valuable natural resource which should be developed. We think it may have significance in terms of national defense, since it is within our own borders. We believe the technology will take some years to work out, in order to become competitive, and we are working toward that end.

Mr. ASPINALL. May I ask a question there? We happen to be talking about my country.

Is there enough oil production today in the United States to take care of the needs of the United States in an international conflict, unless we could bring in outside production?

Mr. PERRY. I am not an expert in this field, sir. I think we will have to admit one thing: We are currently importing about 10 percent of our requirements. The United States is importing approximately 10 percent of its present consumption. This does not mean that in times of emergency we could not produce enough in our own country.

Mr. ASPINALL. The work which is being carried on by all of the business interests outside of the Union Oil Co. is in reality laboratory work, is it not?

Mr. PERRY. To the best of my knowledge.

Mr. ASPINALL. Test-tube operation?

Mr. PERRY. Yes, sir. Small scale, anyhow.

Mr. ASPINALL. A very small scale. The work which has been carried on lately, so far as the extracting of the oil from the shale is concerned, at Rifle, Colo., has been on the large assembly unit program, has it not?

Mr. PERRY. On a larger scale; yes, sir.

Mr. ASPINALL. A larger scale?

Mr. PERRY. Yes, sir.

Mr. ASPINALL. In other words, to make any production feasible at any time in the future it must be a battery production proposition?

Mr. PERRY. Yes, sir.

Mr. ASPINALL. Large retorts lined up in an assembly line?

Mr. PERRY. Yes, sir.

Mr. ASPINALL. Do you know of any private enterprise interest at the present time carrying on that operation?

Mr. PERRY. Well, the Union Oil Co., as you mentioned, has developed a retort. We feel that the one we are currently working on has a greater potentiality.

Mr. ASPINALL. Which one do you mean by "the one we are working on"?

Mr. PERRY. We have a retort that the Bureau of Mines has developed, called the gas combustion retort.

Mr. ASPINALL. Where is that?

Mr. PERRY. At Rifle, sir.

Mr. ASPINALL. But you curtailed its operation this fiscal year?

Mr. PERRY. No, sir. We are still operating at Rifle this fiscal year.

Mr. ASPINALL. The appropriation was cut?

Mr. PERRY. Very slightly, not appreciably.

Mr. ASPINALL. I am glad to know that. If you could have taken some of the money that was refused——

Mr. PERRY. The conference committee restored a considerable amount of that, sir.

Mr. ASPINALL. That is the only operation of its kind that is being carried on in this country at the present time?

Mr. PERRY. As far as I know.

Mr. ASPINALL. It is an absolutely necessary research program?

Mr. PERRY. In the development of any large-scale operation one has to go through a series of steps, each one becoming larger than the one prior to it, in order to be able to scale up. The first thing you do is to work in the laboratory on a small scale and you build a small pilot plant that might be 10 times the plant of your little test-tube plant, and then you go to the next size. The size that you finally go to in your experimentation depends upon what you visualize as the largest plant that you will need to be economic, so you scale the smallest pilot plant to give you that necessary information. That is what we are working on at Rifle in regard to the gas combustion retort. It is in this area that the Assistant Secretary for Mineral Resources is exploring with the oil companies the possibility of their going into a cooperative agreement with us to further explore this possibility.

Mr. WHARTON. Are there any further questions?

Mr. MILLER. Are there any other places besides Rifle, Colo., where the Government is working with shale production?

Mr. PERRY. Yes. We have a laboratory and a very small pilot operation that I discussed with Mr. Aspinall. The laboratory is at Laramie, Wyo.

Mr. MILLER. Anywhere else?

Mr. PERRY. No, sir, not for the Bureau of Mines.

Mr. MILLER. Is it the idea that the Bureau of Mines will scatter these laboratories around in a number of places?

Mr. PERRY. Not on oil shale; no, sir.

Mr. MILLER. I note that recommendation No. 12 states:

> That research work on a particular ore or metal be confined, insofar as possible, to a single station to avoid unnecessary duplication.

Mr. PERRY. Yes.

Mr. MILLER. It would be possible to duplicate these things at a great many places, if you wanted to. It would hardly seem feasible.

Mr. PERRY. We have no such plans.

Mr. MILLER. I notice that you have spent a great many days on this report, and I want to compliment you upon it. I took the report home and read it carefully, and I found many sections that seemed to be excellent.

Now, I notice in one of the sections you recommend that the number of regions be reduced from 9 to 4. Where are the nine administrative regions at the present time? Do you have any remarks on that, Mr. Tudor?

Mr. TUDOR. On map No. 1, accompanying the report the existing nine regions are shown, and following that is map No. 2.

Mr. MILLER. Would that be better administrative procedure? Would it save personnel and some of the taxpayers' money?

Mr. TUDOR. Perhaps I should say the team thought it would be better administrative procedure and would not only save money, but permit the Bureau of Mines to operate more efficiently. We believe that is a proper conclusion. However, as I have noted in the letter of instructions from the Secretary to the Director of the Bureau of Mines, if the Director concludes that that is wrong he can come back

to the Secretary and show wherein the error has been made. As it is now, we believe more efficiency and more economy could be exercised by a four-region development.

Mr. MILLER. After reading the newspaper accounts of what the Department proposed to do, and then taking the report home and quietly reading it by myself, I came to the conclusion there was a great deal of good in the things that you were trying to do and that your survey team had accomplished some things that this committee should notice. That is one reason we asked some of the group to come here this morning and go into a little more detail on it, and go into more detail on some of the reorganization plans.

One thing that disturbed me a bit was the shale problem and the mine safety protection problem that affect those people in the areas where they have mine-safety regulations.

I note on page 3 of your statement, Mr. Tudor, these words:

> I should also like to point out that, in order for some recommendations to be implemented, action by the Congress may be required. Nothing will be done in connection with such matters until congressional action is sought and Congress has acted.

That should remove some of the blast in the headlines of the papers that here is a department of government that is going to ride roughshod over Congress and anyone that gets in their way. It just is not so. The recommendations that are made, many will require Congressional action. Is that your understanding, Mr. Tudor?

Mr. TUDOR. That is our complete understanding, Mr. Miller.

Mr. ENGLE. The chairman has just put his finger on a point that I was interested in, and that is, to what extent these announced changes are administrative outside sanction of Congress and what portion fall within the sanction of Congress, requiring legislation.

Would you be able to say in just a few words which ones will be put into effect immediately and which ones will be held in abeyance until congressional sanction is given, or necessary legislative authority is secured?

Mr. TUDOR. I can say in general that a number of these would require legislative sanction before they were put into effect, and it would certainly be our intention, and our policy, to go to Congress on those matters.

As far as going through this report is concerned, I think the Director of the Bureau of Mines could do that much better than I.

I would also point out, as I have once before, with regard to recommendation No. 14, "That the Bureau should not engage in production activities, and should do everything possible to terminate present production activities," that with regard to helium, clearly, that would be a matter for approval by the Congress before we could do anything about that.

Mr. ASPINALL. I would like to get a correction into the record. The bill to which I referred heretofore does not give the Secretary authority to dispose of helium gas lands or properties. It gives him authority to dispose of byproducts, and properties that are not helium gas bearing. I want that to be clear in the record.

Mr. D'EWART. It was amended to include the phrase "not valuable for helium production." It would be excess properties they no longer have need for.

Mr. ENGLE. Let us take these four basic recommendations. The first is that the number of regions will be reduced from 9 to 4. That would not require congressional approval, would it?

Mr. TUDOR. That the number of regions be reduced from 9 to 4, that would not require congressional action.

Mr. ENGLE. That would be administrative.

Now, No. 2: "That the administration of health, safety, and coal mine inspection activities be separate and apart from scientific and technical research activities." I assume that would not require congressional action.

Mr. TUDOR. We do not anticipate that that would require congressional action.

Mr. ENGLE. No. 3: "That there be a coordinated strengthening of all statistical and commodity analysis work."

Mr. TUDOR. That would not require congressional action.

Mr. ENGLE. No. 4: "That a plan of organization be adopted under which the Washington office retains responsibility for policy and program determination, while conduct and management research are decentralized." I cannot see where any of those would require congressional action.

Mr. TUDOR. We do not anticipate they would.

Mr. ENGLE. And that leaves us where?

Mr. TUDOR. We have 39 others here. They include the four that we have just gone through. Do you want to go down each one of these and discuss them in that respect?

Mr. ENGLE. I wonder how long it would take.

Mr. TUDOR. It would take quite a while because each one would have to be gone into in order to understand all its ramifications.

If it would please the committee, we would be glad to go over this report and itemize those we think would require legislative action.

Mr. ENGLE. I suppose that would be in the interest of saving time. There are so many of these that are in the nature of mechanical changes. It seems to me when you get into the field of abolishing sections, or into the field of disposing of Government property, they would require congressional action and legislation, unless it otherwise exists in the law.

Mr. TUDOR. I think that some of these recommendations relative to the disposal of Government property would not require legislative authority because they are small; for instance, our woodworking shops in our department.

Mr. ENGLE. May I suggest this: that Mr. Tudor, the Director of the Bureau of Mines, or his staff, go through this and give us a memorandum showing which ones, in their opinion, require legislative authority and which ones do not. Also, give us this additional information: where any of the recommendations involved are the abolition of a present function, or the disposal of Government property, if congressional authorization is not required because it now exists in the law, let the memorandum show where it exists and why it is not necessary in those instances. It seems to me, Mr. Tudor, that wherever you abolish a function, or wherever you dispose of public property, unless otherwise authorized by law, the Congress would necessarily be required to pass on it. That is what I would like to know. Would that be agreeable, Mr. Chairman?

Mr. TUDOR. That is workable.

(The matter referred to is as follows:)

It is our opinion that of the 39 recommendations submitted by the Survey Team, Nos. 1, 2, 3, 6 through 13, and 15 through 38, except No. 33, are the type requiring administrative action for which authority appears in the Bureau's Organic Act of February 25, 1913 (37 Stat. 681, as amended; 30 U. S. C. secs. 1, 3, 5, 6, and 7), supplemented by Reorganization Plan No. 3 of 1950 (64 Stat. 1262, as amended July 5, 1952, 66 Stat. 121; 50 U. S. C. 481–520) and Revised Statute 161 (5 U. S. C. 22) which provides, "The head of each department is authorized to prescribe regulations, not inconsistent with law, for the government of his department, the conduct of its officers and clerks, the distribution and performance of its business, and the custody, use, and preservation of the records, papers, and property appertaining to it."

With respect to recommendation No. 4, "That the Bureau increase its cooperation with State mine inspection departments, miners, and operators, to bring all State inspection services up to the general standard of the Bureau's coal mine inspections"—as worded and as we interpret it, this merely directs the Bureau to increase cooperation with the States and to attempt to raise the States' inspection services up to the standard maintained by the Bureau.

With respect to recommendation No. 14, "That the Bureau should not engage in production activities, and should do everything possible to terminate present production activities"—it is doubtful, in view of the circumstances leading up to the Helium Act of September 1, 1937 (50 Stat. 885; 50 U. S. C. secs. 161, 163–166), and the subsequent developments, that the Bureau could cease its present helium activities without passage of further legislation authorizing the same. With respect to all other commodities, the Bureau could cease production thereof at any time such action is determined, administratively, to be in the public interest. It is noted that the Assistant Secretary, by memorandum of July 1, has assumed primary responsibility for this recommendation.

With respect to recommendation No. 33, legislative action would be required before the Bureau has authority to expend funds to support advisory committees. Such authority exists under present regulations for advisory committees for part of the Bureau's programs, but for other programs for which advisory committees were recommended by the Survey Team authority does not exist to pay the expenses of advisory committees.

Concerning recommendation No. 17, "That the experimental work done solely by the Bureau on the production of oil shale and oil from shale at Rifle, Colo., should cease, and that no further work be done with the new retort unless there is a substantial contribution by industry under a cooperative agreement"—it is noted that the authorization contained in the Synthetic Liquid Fuels Act of April 5, 1944, as amended (58 Stat. 190; 30 U. S. C. 321–325), will expire in April 1955. This does not mean that the Bureau of Mines does not have authority to continue its research on synthetic liquid fuels. The Bureau of Mines did not request extension of the Synthetic Liquid Fuels Act because the necessary authority to conduct research in this field is already contained in the Organic Act of the Bureau. This, too, is one of the recommendations for which the Assistant Secretary has assumed primary responsibility.

In view of the directives contained in the act of February 25, 1913 (37 Stat. 681; 30 U. S. C. 5), it is our opinion that further legislation would have to be enacted before recommendation No. 39, "That the general policy of free distribution of the Bureau's output of publications be changed to a general policy of charging an appropriate price, with exceptions to this policy being permitted in carefully considered cases", could be complied with.

To summarize briefly, as the recommendations now stand, additional legislation would only be necessary to carry out numbers 14, 33 and 39.

Mr. TUDOR. I would like to discuss with the committee right now this matter of titanium, because in my opinion that does not involve legislative authority, and if I am wrong I would like to have your recommendations on it. That has been brought up as a critical point in this report.

Mr. ENGLE. Which recommendation is that?

Mr. TUDOR. That appears on page 20 where there is a recommendation:

That the Bureau should not engage in production activities, and should do everything possible to terminate present production activities.

And then in a paragraph down below it says:

The Bureau is producing titanium on a commercial scale at Boulder City, Nev. Present defense projected requirements are of such a magnitude that it will be some time before private industry can meet the tonnage requirements. The Bureau should discontinue commercial titanium production as soon as possible, consistent with national security.

That titanium is a very important and critical material, I think all of us know. The Bureau did a magnificent job in developing a method of purifying that metal, titanium. They did it at this laboratory, and then it became a pilot plant. Today it is producing about 300 tons per year. For a while that was the only production in the country. It is a pilot plant and it is costing us about $5 a pound to produce it.

As a result of the investigations of the Bureau, and because of the development they successfully consummated, industry has now undertaken the production of titanium in many plants around the country and by the end of next year I think our total production will be only a little more than 1 percent of the total in the country, and that total production will be rather high priced. We feel we have done our job in piloting this product and there is nothing to be gained by continuing to produce this small fraction of the total Nation's capacity, and at a high price.

Our feeling is that does not require congressional authority.

Mr. ENGLE. How did you get into it?

Mr. TUDOR. Purely as a development of the metal. It was a research project which was successfully concluded.

Mr. ENGLE. In other words, you do not have specific legislative authority to go into the production of titanium; is that right?

Mr. TUDOR. I think that we have general authority to investigate all of these things, as we are doing, for instance, with the rare earths.

Mr. ENGLE. That is in the field of research. What you have actually done with reference to titanium is to take a pilot plant and make a commercial operation out of it.

Mr. TUDOR. No, sir. We are still a pilot plant, and we are continuing to operate it.

Mr. ENGLE. You have been selling in commercial quantities, have you not? You have been supplying the commercial market.

Mr. TUDOR. We supply about 300 tons a year now.

Mr. MILLER. How long has that been going on?

Mr. TUDOR. I am going to ask someone better qualified to speak on that than I am. I am going to call upon Mr. Paul Zinner, Chief of the Minerals Division, Bureau of Mines.

Mr. MILLER. How long has this titanium work been going on by the Government?

Mr. ZINNER. We started research work on titanium in 1938, and it has grown steadily until at the present time—and I think that this should be put in proper perspective—we are producing about 500 pounds a day. This rate was established when the General Services Administration found they could not meet the military requirements for titanium during the past year. Furthermore, the producers currently in the business were having difficulty in meeting specifications. The plant served two purposes. First, to make up the deficit for a short period of time in military requirements, and second, to serve as a spot where people from industry that were trying to get into

this business might come and learn this technology and then go out and contract with the Government to make up the production necessary.

Mr. MILLER. Titanium, though, is one of the critical strategic metals?

Mr. ZINNER. Yes.

Mr. MILLER. Does not that go into the Government's stockpile? General Services may or may not let private industry get their hands on titanium.

Mr. ZINNER. I think that it should be understood that virtually all of it is going to the military at the present time, and their demands exceed the supply at the present time.

Mr. MILLER. They let some of it out to private industry in connection with defense work?

Mr. ZINNER. That is right.

Mr. TUDOR. I am not sure that I understand you correctly, Dr. Miller.

The Government does not buy all these strategic materials for the stockpile and then sell them from the stockpile to the producers. The portion the Government buys goes into the stockpile and is held there.

Mr. MILLER. Under the law, as I understand it, titanium is one of the critical strategic metals.

Mr. TUDOR. That is right.

Mr. MILLER. Whether it is mined here or brought in, and some is being brought into this country. It goes into a stockpile, and there the General Services Administration may allocate a certain amount of the titanium to defense plants for the production of certain things that go into the defense machinery?

Mr. TUDOR. That is not my understanding. I may be wrong on this. As I understand it, the General Services Administration buys for the stockpile and the material is held in reserve, while the commercial producers—for jet engines, for example—would buy direct from the manufacturer out of this material and not from the stockpile, but under appropriate controls that might be necessary from time to time. Do you know where our 300 tons go per year, Mr. Zinner?

Mr. ZINNER. It is allocated to the contractors who have military contracts, and I could not say which one gets that. It all goes through General Services.

Mr. MILLER. I think that once it gets into the stockpile it cannot be taken out except by action of the President. The President can release some of the critical materials to industry.

Mr. TUDOR. Mr. Liebert, Special Assistant to Assistant Secretary Wormser, can testify to this.

Mr. MILLER. We may be getting into some areas that we should not be in. I remember getting a letter from the executive department on these strategic metals. The chairman and I looked it over and it was marked "secret." I do not know whether any laws have been violated because you and I have looked at them, under the present interpretation of what is secret and what is not.

Mr. LIEBERT. Mr. Miller, there are two ways in which the General Services Administration acquires strategic and critical minerals. Under the Stockpiling Act, Public Law 520, all the minerals and materials procured go into the stockpile where they are frozen, to be

released only under Executive order. The specific contract with the General Services Administration, which was referred to here, is one which was under the Defense Production Act of 1950, as amended, for the expansion of strategic and critical minerals and metals. These particular minerals and metals procured by the General Services Administration do not, unless by special act, go into the stockpile. They may be held and channeled to industry for specific purposes.

Mr. MILLER. I think that I understand that. Then do I understand that titanium now being developed under Government supervision goes more or less directly into commercial channels?

Mr. LIEBERT. It goes into industry as allocated, or directed by General Services Administration in connection with the military. It is used for experimental purposes, fabrication experiments in industry itself as they are developing new uses.

Mr. MILLER. It is costing about $5 a pound, I believe you said, to produce it. When you said, "to produce it." When you sell it to industry, are you showing a profit or a loss?

Mr. LIEBERT. We produce it and charge General Services Administration a price. I am not sure whether it is $5 a pound. I believe that is about the price because many of the contracts which General Services Administration undertook with industry were at $5 a pound.

Mr. MILLER. Are we losing money, then?

Mr. LIEBERT. From the production of this titanium in this particular plant, it is hard to tell exactly what it costs us per pound because of the method of keeping accounts. It is not a production plant as such; it is just a large laboratory. You cannot speak of our installation at Boulder as being a titanium production plant. The production was only incident to a rather oversized pilot-plant operation. It was in existence and did produce successfully a quality material. It served as a very fine demonstration plant to industry.

Mr. MILLER. If the Government has been in the business of producing titanium since 1938 there must be a considerable laboratory established for that purpose. It would seem a proper audit of its activities would show whether titanium produced should sell for $5 a pound or $50 a pound in order to break even on the operation if the Government is to stay in business.

Mr. LIEBERT. That is right. We are not going to stay in the business. At the end of October this year, the termination date of our contract with General Services Administration, we go out of business, because the production there is only slightly over 1 percent of the entire production of the Nation.

Mr. REGAN. Now, this Government pilot plant has done its research work, and other private interests are now making a sufficient quantity so you can get out. You have served your purpose in this research laboratory at Boulder?

Mr. LIEBERT. Exactly, sir, and the facilities there will be put to other uses.

Mr. REGAN. The amount you are turning out now is less than 1 percent of the total amount now being processed?

Mr. LIEBERT. Roughly in that area.

Mr. REGAN. So, whether you are selling at a profit or a loss, you have done your job?

Mr. LIEBERT. Exactly, and at the time we were producing it the price was incidental.

Mr. REGAN. I would like to follow that up just a little bit. They have done their job and they are willing to retire and let private industry proceed? That gets back to the question that we were developing a while ago on the retort of the oil shale.

There is one correction that I think we should have in the record. It is my understanding we are not importing 10 percent of our Nation's requirements of oil, but more than 20 percent of our oil is coming into the United States from foreign lands, which is adversely affecting the development and the exploration of oil in the United States because we have a surplus coming in that is lessening the demand for our domestic oil. We have always heretofore produced enough oil to meet every requirement for our national defense when we were deprived of oil from other sources. I think it is the wrong policy of this Government to increase gradually the importation of oil against the development of our own national resources here because, at the present time, the statement was made, and I think it is correct, that we have some 30 billion barrels of proven reserves flowing or being pumped from wells. That would be a little more than a 12-year supply. The 100-billion-barrel potential in the shale and coal in Utah would be, at the present rate of consumption, more than a 30-year supply, so we have a potential of a 40-year supply overall.

Mr. D'EWART. And we have solid fuels that we have not mentioned.

Mr. REGAN. That is right, and we have not mentioned the power from uranium and other fissionable materials. I do feel as though the oil business, like some of the mining businesses, is being adversely affected through the importation of those resources. It is not encouraging development here at home.

You asked why they did not have retort plants developing oil from coal or shale in various parts of the country. They have the one plant at Rifle that will show the way, and when oil is in sufficient demand, and when the price justifies it, and when the oil from shale can compete with oil as we now have it, the situation will take care of itself through private enterprise. Am I correct in that view?

Mr. TUDOR. That is correct.

Mr. ENGLE. I would like to get back to a point.

Mr. MILLER. I have a question and a short statement first. Do you know what private industry is able to produce titanium for at the present time?

Mr. LIEBERT. Actually the market price as published by Du Pont is around $4.73 per pound of sponge. It is expected that that price will go down substantially as private industry finds out more about production costs.

Mr. MILLER. This great reserve of oil, and the rapid progress being made by scientists the world over—and particularly in the United States—in the production of power brings me to the point where I am not so sure whether this committee should be worried about the development of Hells Canyon and other areas, or waterpower. I am inclined to believe with Senator Johnson of Colorado that in my lifetime I may be able to take home something about the size of the battery in my car and put it in the corner of my basement and produce all of my lights out of a bit of uranium. I am an optimist, enough of one to believe that we are approaching that time rapidly. While I do not say that we should not continue with this experimental research work—I think we must do it—I think the time is just around the

corner when the byproducts that come out of uranium and other similar metals will revolutionize living in the United States and the world.

Mr. ENGLE. We started out to find out how much responsibility Congress has in this, and it was stated that congressional authority would be required for some of the actions. I do not want to see the general public misled about that. I have looked at the 39 recommendations and I cannot find a single one of them which would require congressional authorization. If there is one, I would appreciate it if someone would point it out, because as I looked them over, if the abandonment of titanium production does not require congressional action, none does.

The point that I want to make is that the responsibility for this change should rest clearly where it is, and the general public should not be given the idea all this will have to be approved by Congress when in fact it would not be.

If you gentlemen down there can take any one of thess 39 items and put your finger on one right now and tell me that it requires congressional action I would be very much indebted to you.

Mr. REGAN. It would take congressional authorization for the money to implement all these things. That is probably what they mean.

Mr. ENGLE. What they are doing is quitting everything that requires less money. Recommendation No. 14 says:

> That the Bureau should not engage in production activities and should do everything possible to terminate present production activities.

Do you have to have congressional action to quit?

Recommendation No. 17 says:

> That the experimental work done solely by the Bureau on the production of oil shale and oil from shale at Rifle, Colo., should cease and that no further work be done with the new retort unless there is a substantial contribution to industry under a cooperative agreement.

I do not know. I know this, we appropriated a lot of money one time to build an Air Force and the President of the United States impounded the money and would not spend it for that purpose.

I would like to have you say, which one of these recommendations Congress is responsible for, and then we will take our responsibility. In the meantime, if the public is going to lambast anybody for what is being done to the Bureau of Mines, we want to be sure that they are shooting in the right direction. We have to protect ourselves with the general public too, and if you gentlemen are wholly responsible then you should take it and not say: well, it is up to the Congress.

Mr. REGAN. Did not the Congress authorize the establishment of the retort plant at Rifle?

Mr. ENGLE. That is what I am asking.

Mr. Regan. Can you answer that? Did the Congress give the authority for the establishment of the retort plant at Rifle, Colo.

Mr. TUDOR. They certainly did, by an appropriation of money.

Mr. REGAN. They were not directed by Congress to set up the plant?

Mr. LIEBERT. No, sir.

Mr. ASPINALL. The Synthetic Fuels Act took care of the authorization of the oil shale and the coal and the pilot plant, and that authorization expires the first of next year; is that not right?

Mr. FORBES. The Synthetic Fuels Act; that is correct.

Mr. ENGLE. I am asking you to put your finger on one.

Mr. TUDOR. May I respond to your question? This recommendation No. 14 might, by implication, require congressional action because helium is mentioned there in the discourse following it, but a general recommendation, when it applies to titanium and the ordinary things of that kind, we do not feel that that needs congressional action. Dr. Forbes advises me that recommendation No. 33, which is—

That advisory committees be established and regularly consulted in connection with the functions of the Bureau, particularly in connection with mine health and safety matters, and with respect to minerals, solid fuels, and petroleum and natural gas research—

would require congressional sanction.

Mr. FORBES. There is congressional sanction at the present time, Public Laws 49 and 552.

Mr. ENGLE. Do you have to have congressional authority to have advisory committees?

Mr. TUDOR. We may have to have congressional authority there.

Mr. ENGLE. What about any of these others?

Mr. TUDOR. I think that there are very, very few, and I think we will have to beg the question to you to the extent of making a complete study of this and report to you wherever we can find an implication that Congress might have to act on these things.

Mr. D'EWART. I think in commenting on this Rifle plant we should remember there are two distinct research programs going on. One is the mining operation, to get this rock out of the hills and get it into the retort plant, and second you have a liquid which is not a true oil at all. It has a different molecular structure from oil and part of the experiment is breaking down that molecular structure to make gasoline and other derivatives, and that is a part of research that can be carried on in any university laboratory, or any place equipped to do research in the refining of oil. Those are two separate steps totally distinct, and one is very much apart from the other.

I can see possibly where the research in the mining operation has gone forward as far as it needs to, but there will always be opportunities for further research in breaking down the molecular structure of the liquid that comes from the oil shale. That will probably go forward as it has with oil from the ground. We are still doing research there.

Mr. REGAN. Is not that what the oil companies are now doing, processing the oil that has been extracted from the shale to see what derivatives can be made from it? You mentioned that a few companies were doing that; is that right?

Mr. PERRY. They are working on that aspect of the problem.

Mr. D'EWART. I would like to ask if the general statement that you have made in regard to titanium is true in regard to zirconium.

Mr. TUDOR. It is true with regard to zirconium, except that our processes have not developed to the point they have in titanium and commercial production has not thereby resulted. As time goes on this same story should be true.

Mr. D'EWART. You have not gone quite as far?

Mr. TUDOR. We have not gone quite as far, sir.

Mr. D'EWART. Then the next point on your program is the solid fuels and the research work that has been done in regard to that. Is that the next point that you are going to cover?

Mr. TUDOR. If I may, I would like to go back for 2 or 3 little points that there may be confusion about.

Mr. D'EWART. I am much interested in solid fuels and I hope we can touch on them before the hearings close.

Mr. TUDOR. Mr. Regan mentioned that our production of titanium is slightly less than 1 percent of the total. It will be slightly more than 1 percent at the end of next year. I think it may interest you to know that our production really started on this in 1952 when we produced 22 short tons. We produced as much as three-quarters of a short ton in 1946. That was through the laboratory. We have produced to date 274.57 short tons, so our production is very small.

Now, as to the oil-shale plant, there are really three processes involved there. One is the mining, which has been carried about as far as it can be. The other is the extraction of the liquid from the shale, which is what we are doing with our retort, and finally there is the refining of that liquid, and that is being done elsewhere.

The thing that we are carrying on there is the reduction of that shale rock and extracting the liquid, and that is what the retort is for.

Mr. ASPINALL. Even though the authority expires at the end of this year, my understanding is now that the Department and the Bureau desire to go on with this work that is being done at Rifle in the retort processing?

Mr. TUDOR. No, sir; we are not prepared to make that statement as of today. We have, as I think you know, funds, and have built a new retort there which we are experimenting with, and we hope that we may be able to operate that for 100 consecutive days this year to test it out.

Mr. ASPINALL. It has been in operation possibly how many months?

Mr. TUDOR. It has not been in operation as such except for a few short intermittent periods.

Mr. ASPINALL. When was it completed?

Mr. PERRY. Most of the plant was completed toward the end of the last fiscal year, and some of the first shakedown runs have been started on it.

Mr. ASPINALL. How many tons is it supposed to handle a day?

Mr. PERRY. Three hundred.

Mr. ASPINALL. How many barrels of oil per ton of shale are being taken from the kind of shale that is being handled through the retort at the present time?

Mr. PERRY. Normally it is 30 gallons per ton of shale. That is the average composition. It varies from zero up to about 75.

Mr. ASPINALL. What is the present thinking of the Bureau as to the necessary daily production of such a plant to make a feasible undertaking for private industry?

Mr. PERRY. We do not look upon this as a production plant at all, sir. We have a lot of experimentation to do on this plant. We do not know how quickly or how rapidly that will proceed. We do not look at it in the same way as you would discuss titanium—that when we get so many gallons or barrels a day we have solved the problem. It is an experimental plant. It is a large one and we think it has to be reasonably large because of the nature of the equipment that we are working with.

Mr. ASPINALL. It is really not large, is it, when you take into consideration what will be necessary in the future if we ever go into that production. It is a very small undertaking.

Mr. PERRY. That is right.

Mr. ASPINALL. Do you think that you are going to arrive at any conclusion within the next 5 months as to the feasibility of an operation when you are dealing with a very small retort that has not been in operation yet at all?

Mr. PERRY. Mr. Tudor said the decision on that is being held in abeyance. Part of the reason for that, as I understand it, is that it will depend upon how rapidly we develop this information and what our interpretation of it is, sir.

Mr. ASPINALL. Let me ask you this: If you can run 100 days successfully with this 200- to 300-ton operation, do you think that is going to prove the feasibility of whatever sort of assembly plant will be necessary in the future.

Mr. PERRY. I would say, sir, if we had a successful run for 100 days, we would demonstrate 1 possible plant. Now, with regard to the mining method that was discussed earlier, I would like to say a few words about that because the analogy is direct.

We have a mining method which has reduced the cost of mining appreciably. We think that we have demonstrated a single method. We do not think this will be the last word in mining. We think there are many improvements possible, but we have demonstrated that this one mining method can be used and we have shown approximately what the costs are using this method.

Similarly, if we ran this retort for 100 days, we would be then able to say we have demonstrated for that period of time that type of production and the operating difficulties, if any, that are present in that kind of plant. I do not think that we could draw any conclusions further than that.

Mr. ASPINALL. I think you are right and I agree with you as far as the mining operations are concerned, but I think you are entirely wrong as far as proving any feasibility of the necessary procedures to carry on an economically feasible plant for the production of oil from shale.

Mr. REGAN. I would like a little more light on that. You are running 300 tons through the retort plant from which you are getting a little over 200 barrels of oil?

Mr. PERRY. Yes.

Mr. REGAN. What does it cost per ton to mine the shale?

Mr. PERRY. I can not give you the cost of what it is actually costing us on an experimental basis, but what we did to demonstrate those costs is we actually ran an operation—I cannot remember how many days—but we ran an operation sufficient days to demonstrate this was on the order of 50 cents a ton.

Mr. REGAN. To mine the ore?

Mr. PERRY. Yes.

Mr. REGAN. What does it cost to extract the fluid from the ore per ton?

Mr. PERRY. I think you can get about any answer you want on that because it depends upon the process you use, whose guess it is, and how you capitalize the plant.

Mr. REGAN. You know pretty well that it costs you $5 a pound to get the titanium metal. You ought to have some good idea of how much it costs a barrel to get the oil.

Mr. PERRY. I referred to the National Petroleum Council figures before. They are public property. The guess they made at the request of the Secretary was that gasoline, deposited on the west coast, made from oil shale, might be sold for between 14 and 16 cents per gallon. That was a guess. It is not a demonstrated figure at all. It is the best guess that they could make on the basis of the data available them with me.

Mr. REGAN. Let us get back to that. Do you not have figures on what it would cost to extract a barrel of fluid from oil shale, counting your mining costs and retort costs?

Mr. PERRY. We could probably give you those figures. I do not have them with me.

Mr. REGAN. I think they would be very interesting. Then we would have some idea of the comparison between the cost of oil through your research plant and the cost of oil that we are now getting from wells.

Mr. PERRY. We could make such a guess for you.

Mr. REGAN. I can understand that it would not be accurate, but I think it would be interesting to know, whether it is costing you $2.90 or $6.75 a barrel.

Mr. ASPINALL. Now, there are different procedures being used. If you use merely the test procedure that is one thing; if you use the 20-ton retort daily, that is another procedure. If you use a 500-ton retort operation, you will get another answer, will you not?

Mr. PERRY. Our cost estimates that the Bureau have made have been based on a 10,000 barrel a day plant. We can supply those figures for the record for you.

Mr. ASPINALL. But you do not have accurate figures as to how much it will cost the Government as yet; you do not have a process on which you can make any statement with dependability, is that right?

Mr. PERRY. That is correct.

Mr. REGAN. Mr. Chairman.

Mr. WHARTON. Mr. Regan.

Mr. REGAN. He said they can make a pretty fair country guess.

Mr. PERRY. We feel that we have done that.

Mr. REGAN. You know that it costs $5 a pound to turn out titanium, and you now say there is a probability that they can do it for $4.75. They are doing it, but it still is on a larger scale than yours. They are doing it in the Wilmington plant and it costs there almost as much as it does to run it through a very small plant at Boulder. Personally I do not believe it is possible to supply shale oil on the west coast at 14 cents a gallon. I would like to know what it costs to make that fair country guess. I think the committee would be very much interested in having that information.

Mr. PERRY. I will be glad to furnish that information and make a report to the committee on the matter.

(The matter referred to is as follows:)

At the request of the Secretary of the Interior, the National Petroleum Council in 1950 created a committee to:

1. Review estimates made by the Bureau of Mines of the cost of producing synthetic liquid fuels, and its estimates of comparative costs of producing liquid fuels from crude oil.

2. Prepare independent cost estimates.

3. Make recommendations as to ways and means, if any, for improvement of future cost estimates by the Bureau of Mines.

The estimates for the oil-shale operation are based on the assumption that shale is mined in large scale operations according to techniques developed by the Bureau of Mines. The shale from the mines is then crushed to a suitable size and charged to a retort in which the oil is broken out by the action of high temperatures. The necessary heat is obtained by burning—in a separate part of the retort—the carbon remaining in the shale after the oil has been driven out.

The crude shale oil thus obtained contains sulfur and nitrogen compounds and is highly unstable. The oil is subjected to coking operation and the resulting coker distillate is catalytically hydrogenated under moderate conditions (1100 pounds per square inch and 835° F.). This hydrogenated distillate yields materials which are processed by conventional means to recover finished and semi-finished products which are transported by pipeline from the plant to a major consuming area. Finishing operations as required are carried on at the pipeline terminus.

A raw material reserve of 20 years has been set as a minimum. Costs have been based upon operations conducted predominantly for production of gasoline and diesel fuel conforming to present market specifications. All labor, material, and equipment costs were adjusted to January 1951 levels. The derived product costs do not include allowance for marketing expense. Chemicals and liquefied petroleum gas have been credited as byproducts in developing primary products costs.

In this study, the income-tax rate has been taken at 50 percent of income before taxes. No effect has been given to excess-profits taxes.

Although a figure of 6 percent return on the investment was employed in computing the gasoline cost, it is regarded as highly doubtful that capital could be attracted to so speculative an enterprise at so low a return. Price Waterhouse & Co. in its letter dated September 27, 1951, stated the "opinion that an annual rate of earnings of not less than 15 percent on the total capital invested in or retained in a business subject to the risks of a highly competitive and speculative enterprise would be necessary and reasonable in order to attract investment of private capital."

Provision has been made in the estimates for housing for construction workers and permanent employees to the extent necessitated by the prevailing conditions at the individual plant sites. The net contribution of this housing expense to product cost has been determined with due consideration of money returned to the enterprise through rentals.

	Oil shale	
	Single plant	Multi-plant (5)
Shale, tons per calendar day	76,800	384,000
Products, barrels (42 gallons) per calendar day:		
Gasoline	25,380	126,900
Diesel fuel	12,200	62,360
Liquefied petroleum gas	1,780	8,920
Residual fuel	340	3,050
Total liquid fuels, barrels per calendar day	39,700	201,230
Coke, tons per calendar day	1,180	5,900
Fuel gas, 1,000 B. t. u. per cubic foot: Thousand standard cubic feet per calendar day	24,830	124,150
Chemicals:		
Ammonia, tons per calendar day	92	460
Sulfur, tons per calendar day	43	215
Manpower, total including supervision and administration	3,420	15,750
Construction materials:		
Steel: Thousand tons	178	694
Per daily barrel of total liquid fuel production, tons	4.5	3.5
Construction labor, man-hours times 1,000	26	123
Investment:		
Total, millions of dollars	333	1,518
Dollars per daily barrel product	8,400	7,500
Cost of gasoline with 6 percent return on investment after income-tax cents per gallon	16.2	14.7

Mr. WHARTON. Are there any further questions?

Mr. D'EWART. I believe you were going to take up solid fuels next.

Mr. TUDOR. I do not have that on my notes, nor in my report, as that was not the question of this publicity that came out. In recommendation 15 they state:

> That the Bureau should reexamine its research efforts in the solid fuels area, redirect them to the greatest possible extent along unexplored lines having long-run significance, and avoid those types of research which industry is undertaking or can readily undertake itself.

That seems to me like a sound recommendation, and I have talked to Assistant Secretary Wormser on this subject many times because of the problems of our solid fuels industry, and I think we are all aware that it would be very beneficial if the Bureau of Mines could develop methods for using greater quantities of coal in this country.

We have just about exhausted the limits of exploration there, but we think that there must be some other avenues of approach to this problem. Therefore, without regard to this record, but with regard to the Bureau itself and our conversations within the Department we propose to see what we can find out about it and go into a research program on solid fuels. It will generally have to start from scratch, from laboratory work and then develop from that into other items.

Mr. D'EWART. But there has been a tremendous amount of research work done along these lines already.

Mr. TUDOR. Yes.

Mr. D'EWART. And two particular methods have been developed quite successfully up to this time.

Mr. TUDOR. You are referring to the hydrogenation of coal?

Mr. D'EWART. Yes.

Mr. TUDOR. The Bureau did a very fine job on that and carried it just as far as the Bureau can go and it is available now for general use.

Mr. D'EWART. How does the cost of that compare with getting gasoline from oil shale?

Mr. PERRY. That was a highly controversial question. At the request of the Secretary the National Petroleum Council make a study of the cost of synthetic fuels, starting with both coal and oil shale. Their figures came out somewhere in the neighborhood of 40 cents a gallon for gasoline produced by coal hydrogenation as against this figure of 16 cents for oil shale.

The Bureau, however, made some independent guesses on that which did not check very closely with that. This was a question of study by the Bureau. We had an outside consulting firm check it and it came in between the two extremes, and the matter is still up in the air with regard to the cost because they are only guesses, and you can take your choice as to which is correct.

Mr. D'EWART. You have in the hydrogenation of coal a byproduct which you do not have in the case of shale, you have briquettes, a byproduct?

Mr. PERRY. In the hydrogenation process of the Bureau of Mines there are no briquettes formed. We do form commercial chemicals which are very valuable, but the amount of commercial chemicals that could be absorbed in our markets is rather limited and you cannot predicate the development of the synthetic fuels industry on these valuable byproducts because they would soon smother the market.

Mr. D'EWART. Is it the Bureau of Mines or the Geological Survey that has made a survey of the coal beds of the country to determine the amount of oil that could be derived from these beds?

Mr. PERRY. We made that study.

Mr. D'EWART. You made that study?

Mr. PERRY. Yes, sir.

Mr. D'EWART. You are pretty well informed about that matter both as to availability and the amount of coal——

Mr. PERRY. We have studies under way in the lignite laboratory at Grand Forks, N. Dak., and we are continuing studies at Pittsburgh on the eastern coals and at Tuscaloosa on the southern coals. We are continuing studies with coal on a small scale because we think we can relate those two, and that it is not necessary to test on a large scale.

Mr. D'EWART. In this reorganization it is not planned to discontinue this study but, rather, to go forward with it?

Mr. TUDOR. That is correct. We are going to emphasize for the moment, at least laboratory work to see if we cannot find new practices and new products which can be used.

Mr. D'EWART. Turning, for the moment, to the underground gasification of coal, what are your plans in regard to that experiment?

Mr. PERRY. That is not mentioned in the report, sir, and that work was discontinued at the end of the last fiscal year because of insufficient funds to explore it at the rate we thought it should be explored. However, one of the private companies, with whom we cooperate, one of the oil companies, got interested in undertaikng an experiment with us. We have received permission for the Bureau to contribute in paying part of the cost. This cooperation that we have been discussing was worked out in this case and the Bureau will continue to pay part of the costs so that the gasification work can proceed.

Mr. D'EWART. Are you optimistic as to results of gasification of coal?

Mr. PERRY. It is a long-range experiment, but foreign governments have been exploring it, and we have been keeping in touch with those we can get information from. Everyone thinks if it can proceed economically that it will be an immense stride forward and that we should continue to study this field if we can because it has such great potentialities. In spite of that it may be a long shot.

Mr. TUDOR. It is significant, at least, that private industry is willing to cooperate with us in that field.

Mr. D'EWART. Does the Defense Department do quite a bit of research in the gasification of coal in addition to the work that you are doing?

Mr. TUDOR. Whom did you say?

Mr. D'EWART. Does the Defense Department do quite a bit of research in the gasification of coal in addition to the work you are doing?

Mr. TUDOR. To the best of my knowledge there is no work being done by the Defense Department in this area.

Mr. D'EWART. I know they have done some exploration of coalfields to determine the content of gasoline in coal. Was that work done in cooperation with you, or was it done independently by them?

Mr. PERRY. We were asked for a survey some years ago of the synthetic liquid fuel potentialities by States. This was turned over to the Army engineers who, in turn, obtained the assistance or hired a

private organization to make this survey, and there is a set of reports for each State together with a summary of the potentialities, making certain estimates of the amount of coal and the number of plants which could be erected in the various States for producing fuels from this source.

Mr. D'EWART. Are you continuing your research program on getting a greater number of heat units out of a ton of coal, your thermal studies?

Mr. PERRY. Yes, sir. Actually you cannot make any more heat units than there are in there. We are trying to get a better utilization of them.

Mr. D'EWART. To make them more available?

Mr. PERRY. Yes, sir.

Mr. D'EWART. Are those studies being continued?

Mr. PERRY. Yes, sir, we are trying to develop new methods and new uses for the byproducts which can be obtained from them.

For instance, we have a laboratory at Grand Forks, N. Dak., working on the lignite coals, 1 at Denver working on the subbituminous coals in that area, and 1 large laboratory in Pittsburgh working on the coal in the area there, and a small laboratory in Alabama at Tuscaloosa working on the Southern coals.

Mr. D'EWART. There is no effort in this reorganization plan to decrease the size of any of these research programs; you are continuing them?

Mr. PERRY. We are. This does not contemplate discontinuing those.

Mr. D'EWART. Thank you.

Mr. WHARTON. Are there any further questions?

Mr. BUTLER. I have a few questions, Mr. Chairman.

Mr. WHARTON. Mr. Butler.

Mr. BUTLER. How can you reconcile your policy of continuing these gasification and thermal experiments with your decision to abandon the Louisiana-Missouri program?

Mr. PERRY. I do not think that they are intimately related at all, sir. The Louisiana plant was more expensive to operate than all of these other experimental programs combined. In fact, it was twice as expensive to operate. We felt that the kind of information which we could obtain from the Louisiana plant in proportion to the number of dollars spent was less important than the other programs that we had.

Mr. BUTLER. That answers it.

Mr. PERRY. Yes, sir.

Mr. TUDOR. May I say in answering that same question that we felt, too, that we better back up, go back in the laboratory and see if we could not develop some new basic processes rather than continuing further with that one any longer.

Mr. FORBES. We might also add, for the benefit of the committee, that we will continue with our synthetic work at Bruceton, Pa. and at Morgantown, W. Va. We are carrying on that work continuously.

Another thing that I would like to emphasize at this time is that it is time that the Bureau carried on these research investigations with respect to metals and fuels. That is the reason the Bureau came into being, and one of its principal functions is to carry out research to a

point where industry can take over and make new industries and new employment.

We are on the threshold, as the Secretary has told you, with respect to titanium, zirconium, and rare earths, and it may be interesting to you gentlemen on the committee to know that we have just finished a new laboratory at Reno, Nev., that will devote practically its full time to carrying on fundamental research on the rare earth metals and minerals. There are 16 of them. I would not even attempt to try to pronounce the names of some of them. Those are the reasons that the Bureau is charged today by the Congress with carrying on research with respect to minerals, metals, and fuels, in order to bring them up to a point where industry can take over and make new industries and give new employment to people.

Mr. D'EWART. I would like to say a word right there. I am sure this committee feels that the Bureau of Mines has done a wonderful job in its experimental program and that they have helped industry amazingly in developing some of these processes so that they will be available to them. At least it is my thinking that when you do reach the point in your development where private industry can take over you are going in the right direction in letting them take over.

Mr. FORBES. Yes, sir.

Mr. REGAN. Mr. Chairman.

Mr. WHARTON. Mr. Regan.

Mr. REGAN. I think that the Bureau of Mines has functioned well in the things that it has done in its research development, that unquestionably it has done a fine thing, but I would like to know what you plan to do with respect to the encouragement of the further development of our natural resources.

You talk about what you are going to do with these various research and laboratory plants, and that you are cutting down the number of your regional offices from 9 to 4. Heretofore the miners out on the far mountain peaks had access to a regional office to see what they could do or should do about this or that. I am quite concerned about what you are going to do about further encouragement to the small miners to get out here and find additional resources, if there is any program for the finding of these natural resources which may be available to us in the western country or the eastern country.

Mr. FORBES. I do not believe, Mr. Regan, that the cutting down of the number of regional offices will have any material effect on that program.

Mr. REGAN. I have no quarrel with your reducing your overhead and all of that, but I am just wondering how much of a program you may have in mind to encourage the exploration, development, and discovery of more natural resources in this country. I am entirely in favor of using to the best advantage those resources which have been developed in part, but I wonder if there is any program at all on that other phase of it, encouraging exploration, development, and discovery. Our small miners are in distress throughout the western area, particularly. I was wondering whether you had any program of that kind through the Bureau of Mines because that is their field, and they want to look to the Bureau of Mines for guidance and help in those matters.

Mr. FORBES. That is right. The Bureau of Mines down through the years has carried out an exploration program, and we will con-

tinue to do that. It is handled now by the Defense Minerals Exploration Administration, the DMEA. When they finish their work we will continue on. They are carrying that on at the present time.

Mr. REGAN. You are leaving that entirely to them, then?

Mr. FORBES. Yes, sir, that is right; they are carrying that on at the present time.

Mr. REGAN. But you do feel that is a proper and necessary function of the Bureau of Mines and that it will not be slowed up in your program?

Mr. FORBES. Absolutely not.

Mr. REGAN. That is what I wanted to ask about that, Mr. Chairman.

Mr. WHARTON. Incidentally, our counsel, Mr. Abbott, has a question he desires to ask.

Mr. ABBOTT. Yes, I did want to ask one question. Is the work of the Geological Survey going forward rapidly enough to complement your program in your research and activities? In short, what is the relationship of the Geological Survey program to what you are doing over in your research program?

Mr. ZINNER. As Mr. Forbes has explained, the only research program of that kind is this program in which the Bureau of Mines and the Geological Survey are the field arms of DMEA. We do all the field work that they require. It is done through the local offices, and so forth, made up of their people and Bureau of Mines people.

Answering your question specifically, I would say that the program is in gear, and that this complementary effort is working very well. That applies as far as the research is concerned.

Mr. ABBOTT. What is the situation in regard to the Geological Survey contributing maximum utilization of domestic resources in the minerals field?

Mr. ZINNER. In that respect I would think that both the Survey and the Bureau of Mines program has a long ways to go. There is a lot of work to be done, and we always feel that we are not doing enough of it.

Mr. ABBOTT. That the Survey is proceeding too slowly?

Mr. ZINNER. That is right.

Mr. ABBOTT. Then, in an entirely different area, I ask a brief question, since some complaint was raised upon the release of this report. Turning very briefly to the relationship with the United Mine Workers, do you people feel that your consultation with them with respect to safety and the relationship between the operators and the mine union itself leaves anything to be desired at the present time?

Mr. TUDOR. May I answer a part of that, and then ask Mr. Forbes to answer further in detail as he is more familiar with it? The team did consult with the United Mine Workers, and I am sure we concurred in many of the recommendations as a result of information obtained from the United Mine Workers as well as others. However, that does not imply that the United Mine Workers agreed 100 percent with what the team recommended. I have not asked them to do that, but I do want to point out that they did take them for the most part.

Dr. Forbes has further information on that.

Mr. FORBES. Our relationship with the United Mine Workers of America and the coal operators is excellent. I would like to state that we are getting the very finest cooperation in carrying forward our safety work.

Here in Washington, and I think this should go in the record, the United Mine Workers of America have their own safety organization which is headed by Charles Ferguson who is the safety director.

As to the Coal Operators' Association, we can think of them in three parts: the National Coal Association, which is more or less the parent body, and they have a safety director. Then there is the Southern Coal Producers' Association which takes care of about 100 million tons of production per year, and they a safety director. Then there is the Bituminous Coal Operators' Association which takes care of, I would say, approximately 200 million tons per year of coal, and they have a safety director.

We confer with those groups almost daily. Do not think that for a minute, we do not disagree at times, but we do come out with some real compromises for the betterment of the coal industry.

Mr. ABBOTT. On that specific point, then, I feel I should simply touch on your Recommendation No. 5, "That inspectors notify operators and mine safety committees the day before an inspection is started in order that arrangements can be made to facilitate the inspection." Did the United Mine Workers have any reaction to that recommendation?

Mr. FORBES. I really did not know just what the team did. In fact, I have just found out today that the team actually conferred with the United Mine Workers of America.

Mr. ABBOTT. Is it the Committee's understanding that you have neither approved or disapproved that recommendation?

Mr. FORBES. That is correct. I think the Secretary has brought out very forcibly that there are not any of them inflexible. When we come to a point where they are hard to implement, then we are going to consider them very carefully. If there are any that are impractical, we are certainly going to make a recommendation to our superiors for a change.

Mr. ABBOTT. On recommendation No. 4, which reads:

> That the Bureau increase cooperation with State mine inspection departments, miners, and operators, to bring all State inspection services up to the general standard of the Bureau's coal mine inspections.

would that ultimately result in eliminating Federal coal-mine inspections?

Mr. FORBES. I do not quite get that.

Mr. ABBOTT. Would the carrying out of recommendation No. 4 ultimately result in, or is it your understanding, that is your recommendation, that you ultimately abandon Federal coal-mine inspection?

Mr. FORBES. That is very far in the future. I have been in this work for 40 solid years.

Mr. TUDOR. May I answer that on behalf of the Department? That matter of ultimate abandonment was a conclusion that the committee drew. It is not a recommendation. It is not a recommendation that the Secretary approved.

Mr. ABBOTT. You say "the committee"?

Mr. TUDOR. Yes.

Mr. ABBOTT. What committee are you referring to?

Mr. TUDOR. This survey team. I should say the survey team, and in the language on page 16 they drew the conclusion that:

> As this change in State inspection work is accomplished, the need for Federal coal-mine inspection will decrease and eventually cease to exist.

I point out again that that was a conclusion of the survey team. It was not and is not a recommendation which is approved by the Secretary.

Mr. ABBOTT. It is perhaps desirable that that be made clear on the record. It appears, then, as an observation of the survey team, not as a recommendation; in some segments of the press it was felt it was a conclusion that it would be effective in 12 months.

Mr. TUDOR. The survey team summarizes the 39 recommendations, but that does not appear in these recommendations at all.

Mr. FORBES. Let me make one more observation with respect to that. We are operating our coal-mine inspection work under Public Law 49 and the recently enacted law 552. If the Congress of the United States sees fit to make any changes in the inspection laws it is entirely up to them, but so far they have cooperated with the Bureau, even in going before the Appropriations Committees of the House and Senate. For this particular year they have not cut 1 cent from the Health and Safety Division appropriation. They are cooperating with us 100 percent.

Mr. ROGERS. Then do I understand that the Department does not advocate the result which the press apparently concluded from this report?

Mr. TUDOR. That is correct. The Department does not advocate the abandonment of mine inspection by the Federal Government.

Mr. ROGERS. I have another question. I am sorry that I was late, Mr. Chairman, and I apologize if this is repetition.

Mr. Tudor, there are 2 or 3 questions that have occurred to me. With regard to the helium industry, can you tell me now whether or not the Government plans to sell the helium plants?

Mr. TUDOR. The Government does not have in mind any present plans for the sale of the helium plant. That came about by one recommendation in here of a general nature that the team made specifically with reference to a helium plant. We have made some investigations as to the possibility of that, and we have found no encouragement along that line, and we have no present plans for coming to Congress about that, because that is what we would have to do.

Mr. ROGERS. Yes.

Mr. TUDOR. Congress put us in this business, and if it is changed we would have to come back here to Congress to get their approval.

Mr. ROGERS. I was leading up to whether or not you had any indication from any groups, corporations, syndicates, or individuals, that might reflect a desire on their part to go into the production of helium?

Mr. TUDOR. On the contrary, we have rather discouraging responses to any inquiries that we have made.

Mr. ROGERS. Am I to understand that in the reorganization the Department plans a new division for helium purposes, to handle helium production?

Mr. TUDOR. Dr. Forbes will answer that question specifically.

Mr. ROGERS. Yes.

Mr. FORBES. I think I have your approval, Mr. Secretary, in telling the committee that the Secretary's office has just approved a plan that will continue the helium work in the Bureau, that there will be a

separate entity, and it will be under the Director of Helium Operations who will report direct to the Bureau of Mines in Washington. It is going to be a whole lot better organizational setup. We are going to be able to concentrate on the problem which we have not been able to satisfactorily handle heretofore.

Mr. ROGERS. Where will that Director be located?

Mr. FORBES. For your information he will be headquartered at Amarillo, Tex.

Mr. TUDOR. That was not a portion of this recommendation of the survey team. I think I signed that order within the last couple of weeks on behalf of the Secretary.

Mr. ROGERS. Thank you, sir.

Mr. WHARTON. Unless there is objection at this time I would suggest that we take our list of witnesses and briefly cover anything that has been overlooked up to this time. Is there anything further that you have to present?

Mr. TUDOR. I have nothing further, Mr. Chairman, to add unless there are further questions.

Mr. FORBES. Mr. Chairman.

Mr. WHARTON. Mr. Forbes.

Mr. FORBES. Mr. Chairman, with your permission, I have a prepared statement, and I would like to have it made a part of the record.

Mr. WHARTON. Without objection it is so ordered.

(The statement submitted by Mr. Forbes is as follows:)

STATEMENT OF J. J. FORBES, DIRECTOR, BUREAU OF MINES

Mr. Chairman and members of the committee, I am here today at your request to speak about the report of the survey team that was appointed by the Secretary of the Interior to conduct a study of the organizational setup and operating procedures of the Bureau of Mines. The team was instructed to prepare a report to the Assistant Secretary for Mineral Resources with recommendations as to how the organization and operation of the Bureau of Mines might be improved. The team submitted its report with recommendations to the Assistant Secretary on May 20, 1954, and I believe that each member of this committee has received a copy of the report.

The survey team was composed of five members, each of whom has had long years of management experience in different phases of the mineral industries, and none of whom is an employee of the Bureau of Mines. Although the Bureau is a relatively small Federal agency as compared with some others, its activities cover a wide field and the task that confronted the survey team was formidable. The team conducted a diligent, objective survey. The Bureau of Mines welcomed them at each installation, which the members visited, and cooperated with them wholeheartedly in providing information on organization and operations.

With a memorandum, dated July 1, 1954, the Assistant Secretary for Mineral Resources transmitted a copy of the survey team's report to me with specific instructions as to which recommendations are to be carried out by the Bureau of Mines and the time was designated as to when the recommendations shall be put into effect. A copy of this memorandum is attached to each copy of the report which you have received. As Director of the Bureau of Mines, I shall carry out the instructions of my superiors and shall issue instructions to my subordinates to implement the recommendations of the survey team that have been approved by the Secretary's office so that they may be put into effect as soon as practicable.

I should like to call your attention to the third paragraph in the transmittal memorandum of July 1, which refers particularly to recommendations Nos. 14, 17, 33, and 36. The Assistant Secretary for Mineral Resources will assume primary responsibility with regard to these recommendations.

Recommendation No. 14 states "that the Bureau should not engage in production activities, and should do everything possible to terminate present production activities." This specifically refers to the Bureau's production activities in helium, titanium, and zirconium.

Recommendation No. 17 states "that the experimental work done solely by the Bureau on the production of oil shale and oil from shale at Rifle, Colo., should cease, and that no further work be done with the new retort unless there is a substantial contribution by industry under a cooperative agreement."

Recommendation No. 33 states "that advisory committees be established and regularly consulted in connection with the functions of the Bureau, particularly in connection with mine health and safety matters and with respect to minerals, solid fuels, and petroleum and natural-gas research."

Recommendation No. 36 states "that the Assistant Secretary—Mineral Resources establish a more definite policy governing cooperative, trust and working funds; and such policy should be implemented by the Bureau through necessary regulations, delegations of authority, and procedures for approval."

In addition to the foregoing recommendations, recommendation No. 5, pertaining to notifying mine operators and safety committees the day before a mine inspection is to be started, has been reserved for further consideration by the Office of the Secretary.

I should like to call your attention to the fourth complete paragraph on the second page of the memorandum, which states as follows: "If the Director believes, during the course of effectuating the recommendations, as approved, that significant modifications should be made, he shall submit recommenations in such regard to the Assistant Secretary—Mineral Resources for prior approval by him and by the Under Secretary before taking action. Minor modifications may be accomplished by the Director where in his opinion the change does not represent a significant departure from the views of the survey team as indicated in the report."

The foregoing paragraph, as I understand it, means that the report of the survey team has the general approval of the Secretary's Office, but it does not necessarily imply a rigid adherence to all recommendations. As we begin to put the recommendations into effect, we might find that for one reason or another some might be unworkable or might have to be modified because we might determine a more economical and efficient means of carrying out the intent of one or more specific recommendations. Some latitude is given me as Director of the Bureau of Mines for making minor modifications, but any major alterations which I would consider beneficial would have to be first approved by the Secretary's Office before putting them into effect. That is as it should be.

I would like to say that some of the recommendations of the survey team were being put into effect even before the team had completed its report. Others emphasize concepts and practices that we have been striving to attain for many years.

I can say without reservation that I believe the report provides a foundation on which to build a better organization to serve the public and for carrying out the wishes of the Congress. The paragraph that I quoted last means to me that the Secretary's Office does not consider every recommendation inflexible. You may be sure that I shall do my utmost to expedite the wishes of the Office of the Secretary. As modifications occur to me that I believe to be in the public interest from the standpoint of service and economy and to carry out the wishes of the Congress, I shall, of course, submit them to the Secretary's Office for consideration.

If the members of the committee have any questions, I or members of my staff who are with me today will try to answer them to the best of our ability.

Mr. WHARTON. I have the name of Mr. Henry P. Caulfield here next. Do you wish to present a statement, Mr. Caulfield?

STATEMENT OF HENRY P. CAULFIELD, STAFF ASSISTANT TO THE SURVEY TEAM

Mr. CAULFIELD. No, I do not believe so, Mr. Chairman. I assumed that my role here was just to answer any questions that the committee might care to ask. I was staff assistant to the survey team in the course of its work. Unless there are questions that is all I have to say.

Mr. WHARTON. Mr. Zinner.

STATEMENT OF PAUL ZINNER, CHIEF, MINERALS DIVISION, BUREAU OF MINES

Mr. ZINNER. I think I have said everything that I have to say, Mr. Chairman, unless there are further questions by the committee with regard to the team report that deals with the minerals side of the Bureau of Mines work.

Mr. WHARTON. Mr. Liebert.

STATEMENT OF JOHN G. LIEBERT SPECIAL ASSISTANT TO ASSISTANT SECRETARY FELIX WORMSER

Mr. LIEBERT. I only wish to say that you will note from the letter of Assistant Secretary Wormser to the Director of the Bureau of Mines, approved by the Secretary, that the implementation of recommendations Nos. 14, 17, 33, and 36 were reserved for the Assistant Secretary for Mineral Resources. In his absence I am representing Assistant Secretary Wormser today.

For a brief moment I would touch on the Rifle situation again. We are in contact with those segments of the industry which are interested in continuing experiments on the extraction of oil from shale, and we have received very satisfactory responses in the anticipation that we can get industry to finance and continue the work done at the plant in Rifle, Colo., and thereby use the facilities which cost several million dollars.

We in Assistant Secretary Wormser's office are working directly with the Bureau of Mines in the analysis of recommendations which have been given to them under the direction of the Secretary.

Mr. WHARTON. Thank you.

I also have a memorandum here stating that Congressman Wickersham has a brief statement to present to the committee.

Mr. WICKERSHAM. Thank you, Mr. Chairman and gentlemen of the committee.

STATEMENT OF HON. VICTOR WICKERSHAM, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OKLAHOMA

Mr. WHARTON. The committee will be very glad to hear you, Congressman.

Mr. WICKERSHAM. Mr. Chairman, on April 4, 1953, I made a statement to the United States Bureau of Mines concerning a reserve of helium-bearing gas in the Keyes area of Cimarron County, Okla., and urged the Department of Defense and the Bureau of Mines to work out an arrangement and establish plants in this area.

I am again making this statement in accordance with the findings of the Bureau of Mines and the needs of the Department of Defense.

The gas in the Keyes area contains about 2 percent helium by volume and the Bureau of Mines is interested in the possibility of utilizing it as a source of helium now that the demand for helium and other circumstances warrant it.

Only last month President Eisenhower asked Congress for an additional $6 million for more production facilities, so great is the demand.

To meet the increased demand, the Bureau of Mines has made tentative plans to construct a plant at Keyes, Okla., which would process gas from the Keyes field. This is approximately 90 miles north of the existing Exell, Tex., plant.

The reserve of gas in the Keyes field has a high helium content and promises longer life than the supply at Exell, Tex. The higher helium content and the longer prospective life of the gas at Keyes gives this location advantages over proposals from the standpoint of future costs of operation and amortization. A smaller gas processing capacity would be required at Keyes for a given output of helium than at other proposed locations.

After thorough study by the Bureau of the Budget, with the assistance of the Office of Defense Mobilization, the President recommended an appropriation of $6 million to the Bureau of Mines to expand helium-producing facilities. The House Appropriations Committee reduced this amount by $1 million.

The $6 million estimated by the Bureau of the Budget is the minimum required to construct the Keyes plant and secure the amount of helium presently required to meet the demands of the Navy, Army, Air Force, Atomic Energy Commission, and Weather Bureau. If the $5 million figure prevails, it will only result in less capacity which will eventually call for an expenditure far in excess of the $1 million saved.

Much of the gas produced in the Keyes field goes into the pipelines of the Colorado Interstate Gas Co., which early in May made a tentative proposal to the Bureau of Mines which would provide for joint operation of the Keyes plant. The Colorado Interstate Gas Co.'s proposal includes the processing of company gas from the Keyes field to remove the 2 percent of helium and approximately 28 percent of nitrogen, thus providing a more salable fuel from the Keyes gas and, at the same time, providing the helium needed by the Bureau of Mines. In the operation, the Keyes gas would be processed for the purpose of:

1. Recovering natural gasoline.
2. Removing nitrogen to improve the heating value of the gas.
3. Producing helium.

An almost ideal arrangement from the standpoint of strategic advantages, economics, and conservation would be to install equipment for the production of helium adjacent to the railroad at Keyes, in conjunction with a plant for the extraction of gasoline, the removal of nitrogen, and the production of helium. Such an arrangement would save the Government any cost of owning and producing natural gas reserves.

The Bureau of Mines prefers the Keyes plant over others being considered. A plant at Keyes would be of great economic assistance to an area located in the heart of the drought which has prevailed over the past 3 years.

In conclusion, I strongly urge the Deaprtment of Defense and the Bureau of Mines to work out an arrangement and establish a plant at Keyes, Okla.

Senator Kerr has made a similar recommendation to the Senate Appropriations Committee.

Thank you, Mr. Chairman.

Mr. WHARTON. Are there any questions?

Mr. REGAN. There is one thing that I do not think we have covered in the discussion of mines and safety of them at all. Do you have any program at all with respect to the production of coal, and those who are engaged in that business, that may alleviate their condition today?

Mr. TUDOR. Yes, I have previously touched on that. We are very well aware of the difficulties of that industry, and we are doing some fundamental research to see if there are other methods which can be employed or places where that coal can be usel. Also, of course, gasification research is along that line too.

Mr. REGAN. There is no diversification for coal miners. They have no other means of livelihood than digging coal. You have not gone far enough in your research to find out what might be done to help those coal miners who are out of work entirely?

Mr. TUDOR. You mean in finding other work for them?

Mr. REGAN. Yes.

Mr. TUDOR. No, sir, we have not done that.

Mr. REGAN. You have not any suggestions along the line of doing what we can to increase the use of coal so that the workers may get a better degree of employment as well as securing more business for the coal operators?

Mr. TUDOR. That is correct.

Mr. REGAN. My understanding is that the Department will, together with our counsel, present to the committee in a reasonable time a number of items here that will require congressional action.

Mr. TUDOR. We will do that, sir, promptly.

Mr. REGAN. That is all.

Mr. ROGERS. Mr. Tudor, in regard to some of the recommendations about doing away with the operation of certain projects by the Government and substituting the policy of contracting for those, I believe recommendations Nos. 37 and 38 are the two I have in mind, do those recommendations flow from the idea of trying to reduce the cost to the taxpayers of those particular items?

Mr. TUDOR. Yes, sir.

Mr. ROGERS. You feel that you can contract for them cheaper than you can operate a machine shop or a woodshop?

Mr. TUDOR. Yes, sir, that is correct. For instance, we have woodshops where we are building cabinets and furniture for our buildings just to keep them busy. So, we feel that some of that can be curtailed for the benefit of getting more out of the dollar that goes to the Bureau.

Mr. ROGERS. The reason for asking the question is sometimes they get me confused with all of the different ways that they figure these things. What I am really pointing out is if you could go out here and contract for that furniture cheaper than you could build it yourself, without taking into consideration that there might be some income tax and some pay to workers involved, I mean not just in dollars and cents, you think that you could contract for these items that you point out cheaper than the Government can provide them through the use of these shops?

Mr. TUDOR. The survey team made these recommendations, but my recommendation on the recommendations is just from a dollars and cents proposition, getting as much as you can out of the dollars ap-

propriated to the Bureau. We have lathes standing by with operators doing very little work on them, and we have cabinet shops which do not do much work over the year, and there are many opportunities here for saving some money. I agree with the survey team's recommendations.

Mr. ROGERS. I am for saving money, but I do not want to get into the situation where the taxpayer pays more in the end in order to save some money in this way.

Mr. TUDOR. We have not gone into that operation here, sir.

Mr. ROGERS. Thank you.

Mr. D'EWART. Mr. Chairman.

Mr. WHARTON. Mr. D'Ewart.

Mr. D'EWART. Before we adjourn, I think the committee should recognize the members of this survey team who gave of their time, their background, their knowledge and energy to help in this survey in connection with making means available to our Government to give better service throughout the country.

These are men who stand high in their professions, deans of mining schools, presidents of mining companies, and others. In the kind of service which they are giving I think they have performed something that will be helpful to the Bureau of Mines and, in the long run, will mean better government for all of us. I think the committee recognizes the services of these men in making this report for us.

Their names are Dr. Curtis L. Wilson, dean of the Missouri School of Mines; John C. Kinnear, Sr., former vice president, Kennecott Copper Corp.; Dennis L. McElroy, vice president, Pittsburgh Consolidation Coal Co.; J. R. Butler, president, Butler Johnson Corp., Houston, Tex., and member of the petroleum consulting firm of Butler, Miller & Lentz, and vice president of Independent Petroleum Association of America; Spencer S. Shannon, Bedford, Pa., former Director, Materials Office of the former National Security Resources Board; Henry P. Caulfield of the Department's technical review staff and George E. Robinson of the Office of Administrative Assistant Secretary, who served as staff assistants to the team.

Mr. WHARTON. I, also, wish to add a word of appreciation to you gentlemen for appearing before the committee. I am sure your views are very valuable to all of the members, and I hope an exchange of views on our part may be of some assistance.

Mr. TUDOR. We appreciate the opportunity to appear before the committee, Mr. Chairman.

Mr. WHARTON. If there is nothing further we will stand adjourned.

(Thereupon, at 12:15 o'clock p. m., the subcommittee adjourned subject to the call of the Chair.)

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